Late Chalcolithic to Early Bronze Age Settlement Patterns in the Greater Western Jazira: Trajectories of Sedentism in the Semi-Arid Syrian Steppe

SMITH, STEFAN,LORENZ

Abstract

Late Chalcolithic to Early Bronze Age Settlement Patterns in the Greater Western Jazira: Trajectories of Sedentism in the Semi-Arid Syrian Steppe

Stefan Lorenz Smith

In the well-researched archaeological landscape of Northern Mesopotamia, there exists a large region of little-to-no previous investigation: the Greater Western Jazira (GWJ) of northeastern Syria. This thesis takes a geographically holistic approach to investigating the GWJ, focussed on the crucial time of the late 5th to 3rd millennium BC. This period saw an initial abandonment of sedentism in the steppe during the Late Chalcolithic, and subsequent rapid settlement growth with large urban centres in the Early Bronze Age. These dynamics are examined by collating diverse ground truth data from four excavations, three surveys, and several other investigations. These are integrated with extensive remote sensing research, involving the systematic analysis of all areas of the GWJ using satellite imagery and elevation data, processed through a GIS database. During the course of this research, a refined categorisation of heterogeneous varieties of the large fortified tell settlement type commonly termed "Kranzhügel" is developed and implemented.

The evidence gathered shows a complex system of sedentary habitation in the steppe, with a total of 302 sites likely dating to the period in question, 160 of which were newly identified by this thesis. Analyses carried out on site densities, settlement sizes, grain production, supporting settlements for centres, and site alignments allow several economic systems to be proposed. These show that various areas of the GWJ not only underwent very different sedentarisation (and possibly nomadisation) processes, but also owed their existence to both indigenous developments and external forces; and their survival to diverse interdependent practices including agro-pastoralism and trade. Specifically, two distinct trajectories of early and mid-EBA settlement are identified in the north and the centre-south of the region, respectively. Placing this in a wider context, it is shown that the GWJ was an integral part of the Northern Mesopotamian economic and political landscape, belying its reputation as a "marginal" area. Thus it becomes evident that this region demands greater integration into analyses and theories concerning Near Eastern archaeology.

Late Chalcolithic to Early Bronze Age Settlement Patterns in the Greater Western Jazira

Trajectories of Sedentism in the Semi-Arid Syrian Steppe

Stefan Lorenz Smith

Submitted for the qualification of Doctor of Philosophy
in the Department of Archaeology, Durham University, United Kingdom

May 2015

Table of Contents

List of Figures

List of Tables

Commonly-Used Abbreviations

CAST – Center for Advanced Spatial Technologies

DAI – Deutsches Archäologisches Institut

DEM – Digital Elevation Model

EBA – Early Bronze Age

EJZ – "Early Jezirah" chronology of the ARCANE project

EME – "Early Middle Euphrates" chronology of the ARCANE project

FCP – Fragile Crescent Project

GIS – Geographic Information System

GWJ – Greater Western Jazira

LBA – Late Bronze Age

LC – Late Chalcolithic

MBA – Middle Bronze Age

RCC – Rapid Climate Change

TAVO – Tübinger Atlas des vorderen Orients

Acknowledgements

This PhD was made possible by much expertise and input from a very large number of people. I am immensely grateful to all those who aided me in this, and hope those I inevitably forget to mention here will forgive my oversight.

First and foremost, I wish to express my extreme appreciation for the support, guidance, and mentoring of my primary supervisor, Tony Wilkinson. Suffice to say that this thesis would not have come to fruition without his considerable influence on my academic development. I consider myself very lucky to have been able to call him a colleague and a friend, and am amongst the many by whom he is sorely missed.

Heartfelt thanks go also to my second supervisor, Graham Philip; particularly for his great help during the last few months of my writing, when he essentially took on the workload of two supervisors. His comments did much to significantly improve this thesis. Ideas, knowledge, and data were also given by a large number of people at Durham over the last four years, including but not limited to Emma Cunliffe, Niko Galiatsatos, Dan Lawrence, Rune Rattenborg, Sébastien Rey, and Louise Rayne. Additional thanks go to Louise for her processing of GPCC rainfall data for my region.

Further afield, much data and general information was given to me by a variety of very willing and co-operative people, to all of whom I am extremely indebted. Particular thanks go to Christian Falb, Catherine Higel, Frank Hole, Julia Meister, Bernd Müller-Neuhof, Philippe Quenet, Gil Stein, and Jason Ur.

Für Informationen und Anregungen bezüglich des Tell Chuera Projektes der Goethe-Universität Frankfurt am Main richte ich Jan-Waalke Meyer herzlichen Dank aus. Vielen Dank auch an alle am Institut für Orient-Archäologie, dessen Informationen über die Chuera-Region mir sehr geholfen haben. Dazu möchte ich Veronika Kudlek ganz besonders für das Überreichen Ihrer ausgewerteten Daten des Wadi Hamar Surveys und die Erlaubnis, diese in meine Forschungen einzubeziehen, sehr danken.

Für die gütige Zusendung von GIS-Daten der “Geländebegehung in der Westjazira” danke ich Dr. Berthold Einwag und Herrn Christoph Fink. Frau Gerti Preuss danke ich ganz herzlich für die Zuschickung ihrer Magisterarbeit zum TAVO-Survey.

Various sources of funding contributed to enabling me to carry out and complete my PhD. In this regard, I wish to thank the Land of Carchemish Project for providing me with various paid posts. Thanks also to the Graduate School “Human Development in Landscapes” at the Universität Kiel, Durham’s Fragile Crescent Project, the Research Training Group “Value and Equivalence” at the Goethe-Universität Frankfurt, the British Association for Near Eastern Archaeology, and the Durham Castle Scholarship Fund for enabling my participation at various conferences. Additionally, I am grateful to the Council for British Research in the Levant, and in particular Carol Palmer, for providing me with an excellent research environment for the final stages of writing this thesis.

With the primary data used in this thesis stemming from fieldwork carried out within the borders of Syria, I wish to thank the people of that country for their extreme generosity in sharing their expertise and labour in the service of uncovering their heritage.

Finally, I would like to thank all my friends, family, and pets who have made my life an extremely happy one over the last four years, especially during times of intense thesis-related work. In particular, I wish to thank Mama and Dad for their unwavering love for me and support for my studies. Lastly, thanks to Helen for her love, support, encouragement, help, and for putting up with me being extremely busy for so long. I look forward to spending more time together now.

In memory of Tony J. Wilkinson

“What I owe you is beyond evaluation.”

Chapter 1
The Greater Western Jazira and its Landscape in Context

Section 1.1: Overview and Scope of Research

1.1.1. Background and Context

Since the introduction of nascent regional approaches to Near Eastern archaeology with the work of Robert J. Braidwood and Thorkild Jacobsen in the 1930s, projects with landscape-based objectives have flourished in the region (Redman 1982). Since the 1970s in particular, these have covered large sections of land, with ground and, more recently, remote sensing-based surveys investigating much of Northern Mesopotamia in particular (Fig. 1.3; Wilkinson 2000a), complementing the long history of site-based investigation in the region (Fig. 1.4; see for example Larsen 1996). Despite making significant contributions toward a greater understanding of the holistic archaeological landscape, these studies have often remained isolated entities[1], with many employing unique methodologies, chronologies, and research aims (Lawrence 2012: 19-20). This has, in many cases, not eliminated the problems faced by introspective site-based investigations, but merely widened their scope.

Several recent attempts have been made to overcome these issues however, and develop methodologies for synthesising a variety of heterogeneous datasets. One such is Durham University's Fragile Crescent Project (FCP), in which I am a participant, and which has greatly aided the conducting of this thesis' investigations. Focussing on Northern Mesopotamia and the Levant, this interdisciplinary research group has collated a total of nine surveys to which it has direct data access, as well as incorporated several additional projects' data from publications and personal communications; the aim being to create "a single geographical and environmental framework", as well as introduce remote sensing data within an overarching Geographic Information System (GIS) database (Galiatsatos *et al.* 2009). This ambitious project has been very successful at achieving these aims, but is still limited by the availability of data. Invariably, some parts of this region remain better investigated than others, hampering holistically-minded studies which are often forced to skip over areas with a paucity of data, some more significant than others.

[1] Though notable exceptions, mainly from Southern Mesopotamia, exist; see Lawrence 2012: 18 for references.

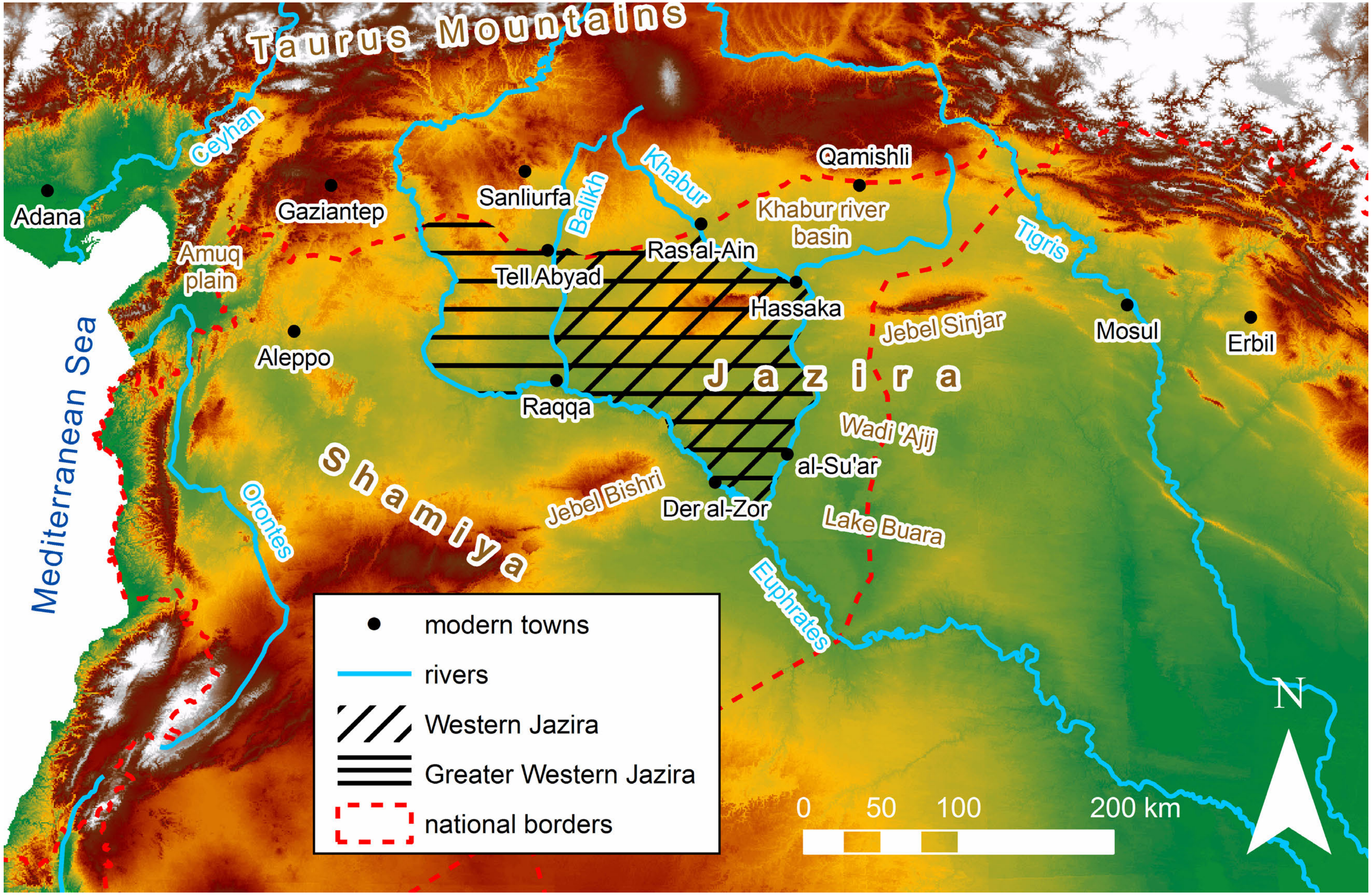


Figure 1.1: ASTER elevation map showing the location of the Greater Western Jazira in its regional context. ASTER GDEM is a product of METI and NASA.

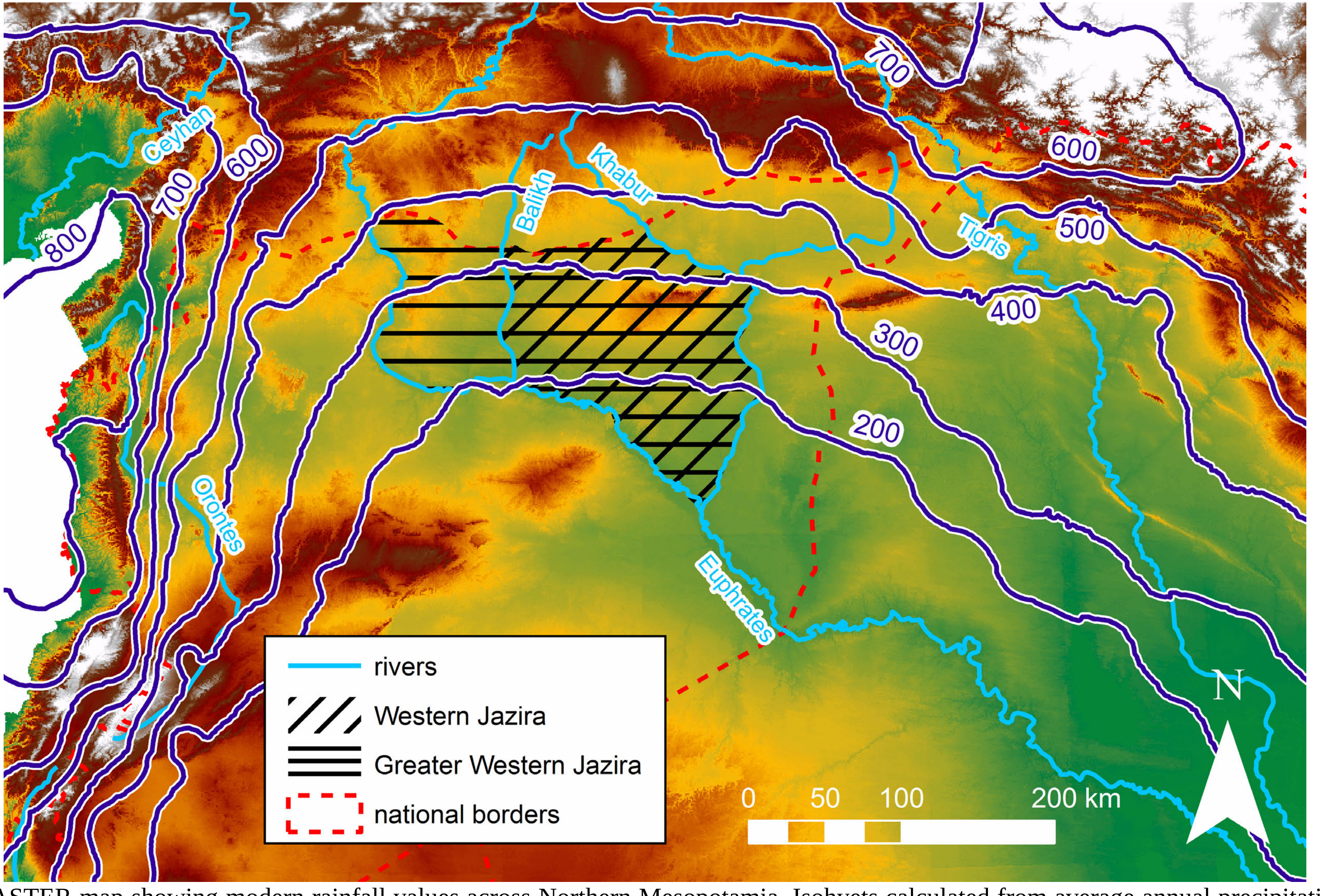


Figure 1.2: ASTER map showing modern rainfall values across Northern Mesopotamia. Isohyets calculated from average annual precipitation between 1980 and 2010 from the Global Precipitation Climatology Centre (GPCC); processed by Louise Rayne of Durham University.

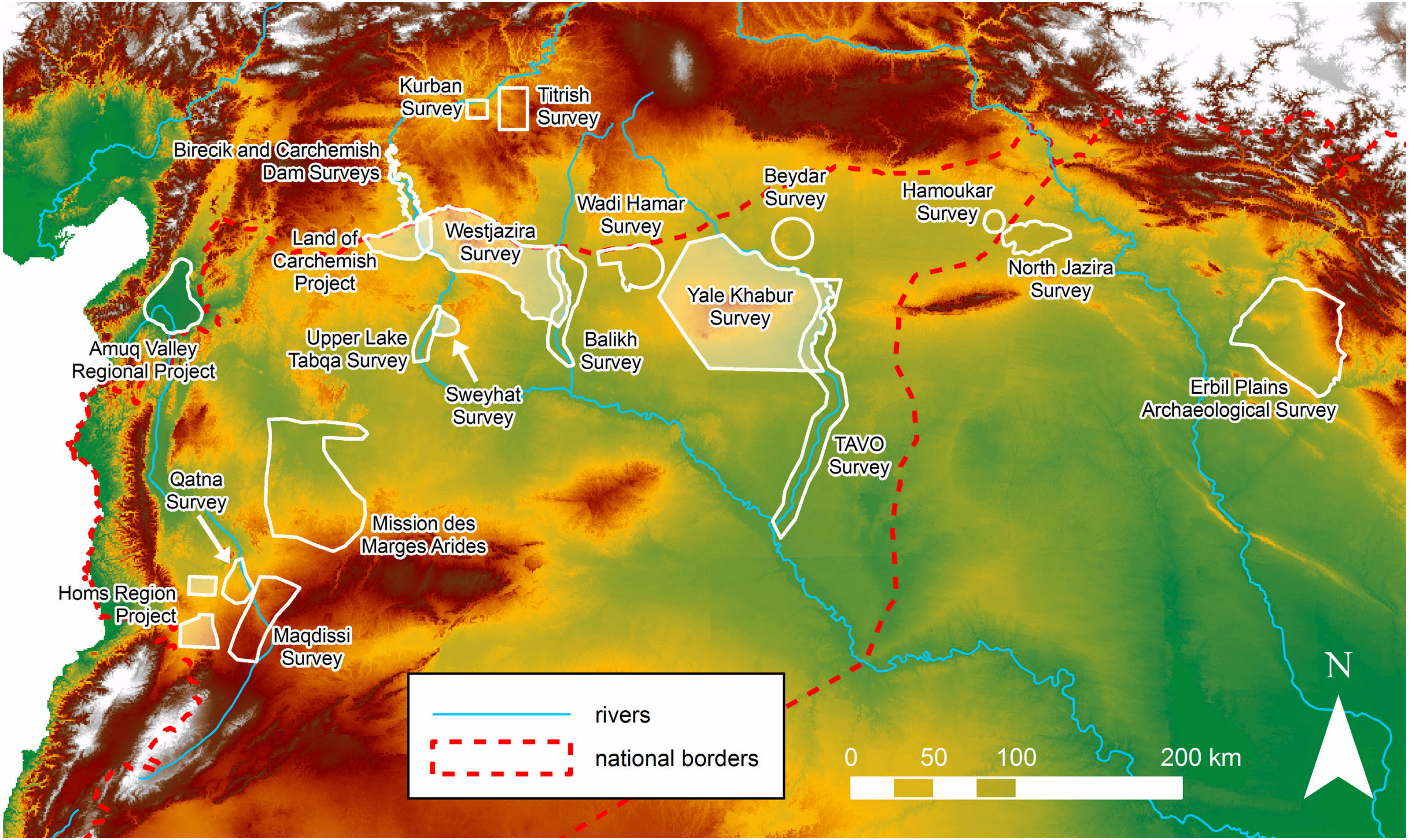


Figure 1.3: ASTER map showing all surveyed areas in Northern Mesopotamia.

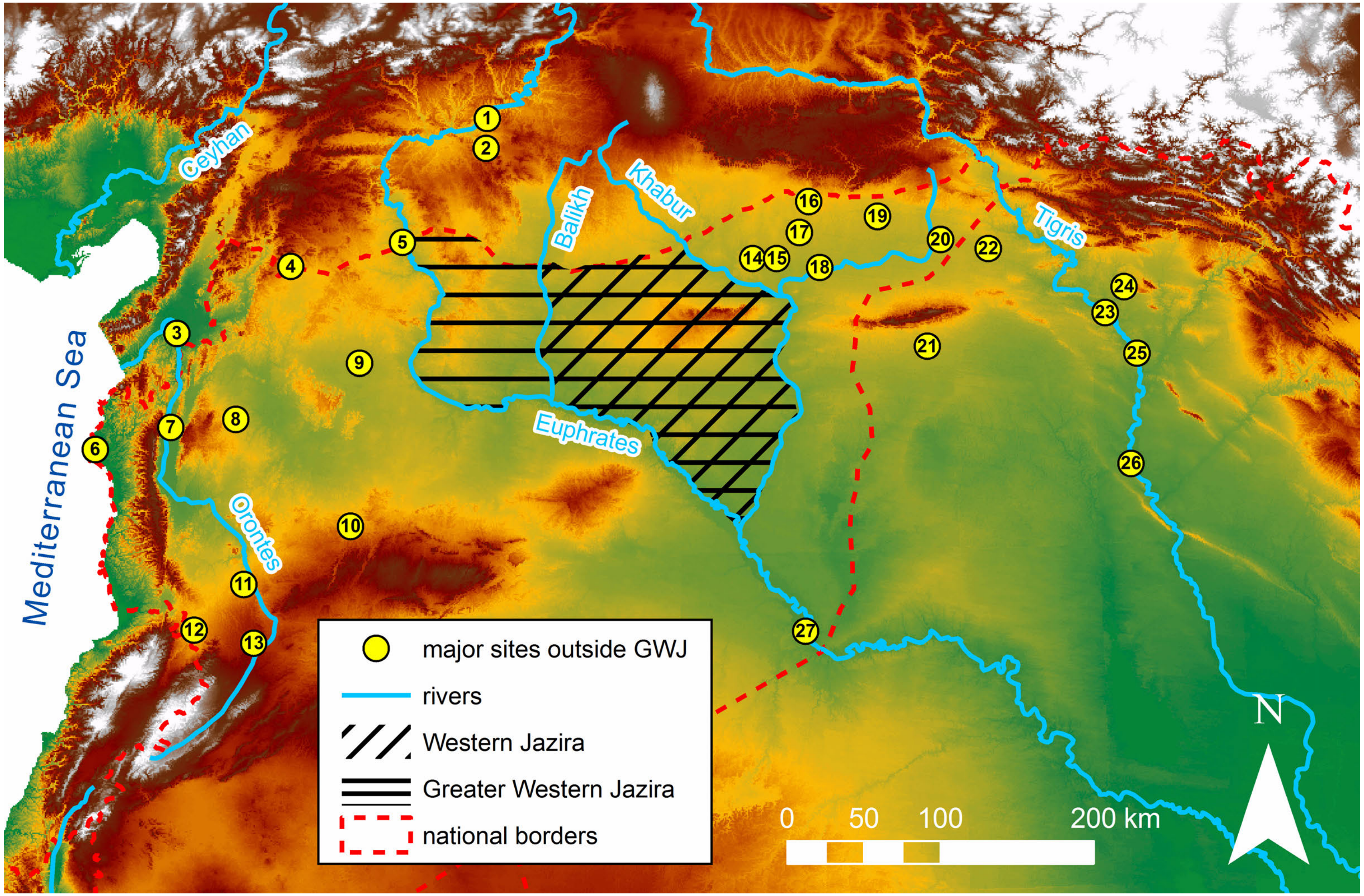


Figure 1.4: ASTER map showing the locations of major sites in Northern Mesopotamia, excluding those within the Greater Western Jazira. 1 - Lidar Höyük, 2 - Samsat, 3 - Alalakh, 4 - Oylum Höyük, 5 - Carchemish, 6 - Ugarit, 7 - Tell Qarqur, 8 - Ebla, 9 - Umm al-Marra, 10 - Tell al-Rawda, 11 - Qatna, 12 - Qadesh, 13 - Tell Sha'irat, 14 - Tell Beydar, 15 - Tell Bati, 16 - Tell Mozan, 17 - Tell Chagar Bazar, 18 - Tell Brak, 19 - Tell Leilan, 20 - Tell Hamoukar, 21 - Tell Khoshi, 22 - Tell al-Hawa, 23 - Nineveh, 24 - Tepe Gawra, 25 - Nimrud, 26 - Assur, 27 - Mari.

1.1.2. A Significant Knowledge Gap

One particularly large gap in well-researched knowledge of Northern Mesopotamia, where studies have been infrequent, selective, and insufficiently disseminated, is geographically defined as the Greater Western Jazira (GWJ). This semi-arid to arid steppe region covers over 27,000 km^2 in the northern area of modern-day Syria, occupying a region bordered by the Euphrates and Khabur rivers to the south, west, and east, and the southern foothills of the Taurus mountains to the north, roughly represented by the modern Turkish-Syrian border (see Section 1.2.1.2; Figs. 1.1 & 1.2). This has long been considered a "marginal" area, which, due to its general lack of precipitation and location away from the well-researched river valleys, was long assumed to be able to offer little in the way of widespread archaeology (see e.g. Bell 1911: 65; Mallowan 1946 [only recognises the very large tells]; von Oppenheim 1900: 1-6). Until the mid-1950s, at a time when prototype surveys had already been conducted in regions such as the Khabur alluvial fan, Balikh valley, and Jebel Sinjar (Lloyd 1938; Mallowan 1936, 1937, 1946), and sites like Tell Brak, Chagar Bazar, and Mari had undergone multiple seasons of excavations (Fig. 1.4; Mallowan 1936, 1937, 1947; Parrot 1940), the GWJ had hardly even been explored. This has resulted in a potentially very skewed picture of past settlement dynamics in Northern Mesopotamia, as this region has either not been considered in regional interpretations, or treated as a separate entity only (see below).

More important than this spatial knowledge gap, however, is the gap in interpretations and integration of settlement morphologies and potentially cultures specific to the Early Bronze Age (EBA; 3rd millennium BC) in the GWJ; specifically, the sites known as "Kranzhügel". In part, the relatively low academic profile of these large fortified tell settlements[2] can be put down to the paucity of prior investigation in this region, with a total of only four excavations and three full-intensity ground surveys having taken place within the area. However, the existence of "Kranzhügel" has been known of, and the majority of their examples mapped, since the travels of the explorer Max von Oppenheim in the 1910s and 1920s (Moortgat-Correns 1972; see Section 2.1.2.1); indeed they are the best-known (and often only known) EBA settlements in the region, and thus significantly overshadow most discussions of it. Rather, the unusual nature of these sites presents a difficulty to most interpretations of a regional scope, which have tended to see the semi-arid and arid steppes as "peripheral" areas, used by large long-term polities in more fertile regions for pasturelands and perhaps a modicum of agriculture, but basically the domain of nomadic

[2] For a description of the previously-perceived morphology of "Kranzhügel", as well as the development and definition of a new typology of these sites for this thesis, see Section 3.6.

peoples (Lyonnet 2001, 2009). While this is a reasonable hypothesis due to the low rainfall levels of the steppe regions (ca. 150-350 mm annual precipitation; see Sections 1.2.2.2, 1.2.3), "Kranzhügel", with their large sizes and massive fortifications and buildings, fit poorly into such a model. Peter Akkermans and Glenn Schwartz (2003: 256-259) recognised this issue as "the *Kranzhügel* problem", an apt description for how much of academic discourse on Northern Mesopotamia has viewed the existence of these sites. As such, they often receive brief mention in regional studies, but rarely take centre stage.

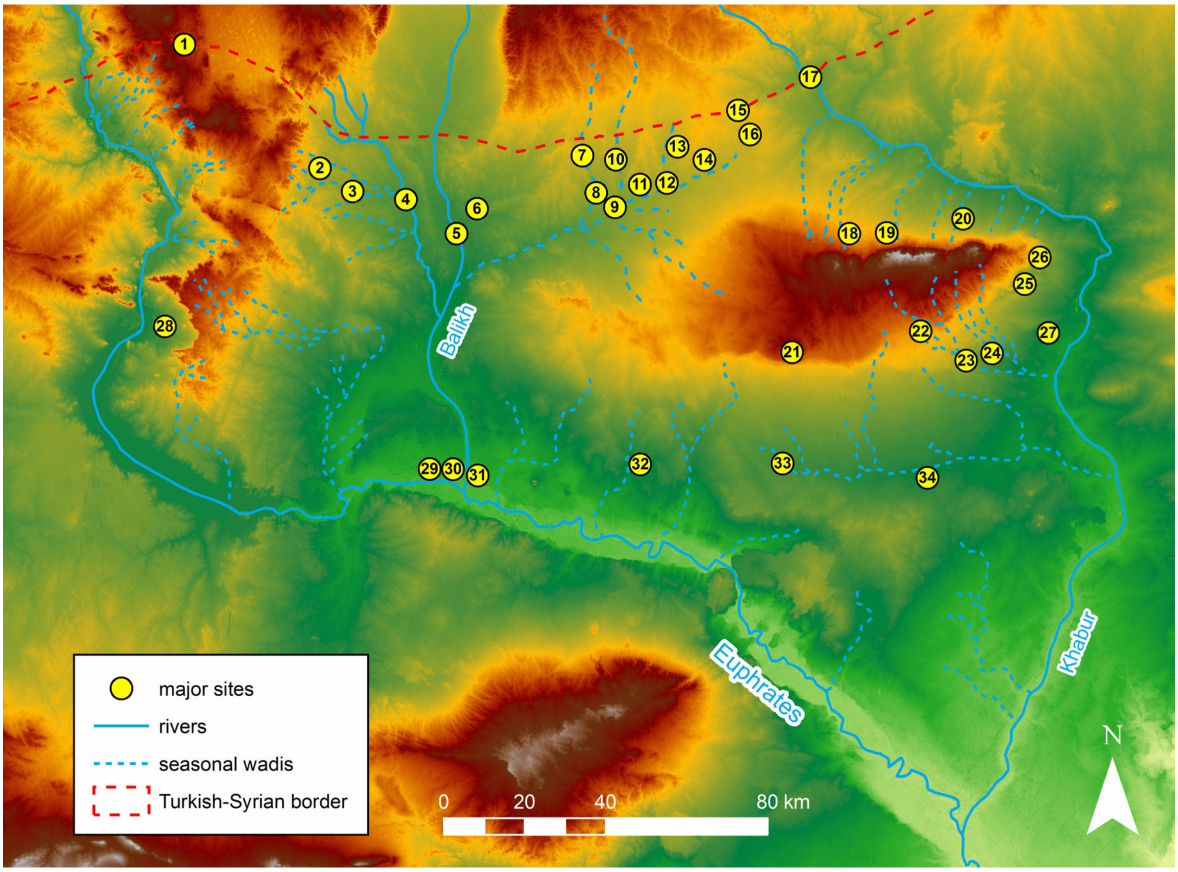


Figure 1.5: ASTER map showing the locations of previously-known major sites in the Greater Western Jaziran steppe.
1 - Tell Sha'ir [Sarugh], 2 - Tell Matin, 3 - Tell Kufaifa, 4 - Tell Barabra east, 5 - Tell Hammam al-Turkman, 6 - Medinet al-Far, 7 - Tell Ghajar al-Kebir, 8 - Tell Dakhliz, 9 - Tell Tawila, 10 - Tell Chuera, 11 - Kharab Sayyar, 12 - 'Ajila south, 13 - Tell Glai'a, 14 - Tell Abu Shakhat, 15 - Tell Khanzir, 16 - Tell Bogha, 17 - Tell Halaf, 18 - Tell Mabtuh Gharbi, 19 - Tell al-Magher, 20 - Tell Mabtuh Sharqi, 21 - Ras al-Tell, 22 - Tell Mu'azzar, 23 - Tell Mityaha, 24 - Tell Murtiya, 25 - Tell Makhrum, 26 - Tell Barud, 27 - Tell Maraza, 28 - Tell al-Sweyhat, 29 - Islamic-era Raqqa, 30 - Tell Bi'a, 31 - Tell Zeidan, 32 - Tell Sha'ir [Jazira], 33 - Tell Zahamak, 34 - Khirbet Malhat.

Despite this, a substantial corpus of knowledge does in fact exist about the GWJ, which shows that the semi-arid steppe between the Euphrates and Khabur rivers presents a settlement history unique in the archaeological landscapes of the region. To summarise briefly, human occupation is evident from the Palaeolithic (ca. 30,000 BP) onwards, mostly in the form of small, often temporary sites until more permanent settlements formed in the Halaf (6th millennium BC) and Ubaid (late 6th-5th millennium BC) periods, including the type-site Tell Halaf on the periphery of the region (see Fig. 1.5; Orthmann 2002; Baghdo *et al.* [eds.] 2009). Yet this general, albeit slow trend toward a greater number of larger and more complex sites came to a halt in the Late Chalcolithic (LC; late 5th-4th millennium BC) period, during which the overall number and individual sizes of settlements reduced drastically. In fact, the GWJ experienced a dearth of settled occupation during the latter half of the 4th millennium BC until the very late 4th/early 3rd millennium (Hempelmann 2013: 271; Meyer 2010a: 17-18). Such a discontinuity of settlement is in marked contrast to the fertile river valleys and basins adjacent to the region, where urbanism waxed and waned, but settlement remained largely continuous during this period (see Section 5.4.2.1).

During the EBA, the GWJ saw an unprecedented rapid and substantial increase in settlement, with large “Kranzhügel” such as Tell Chuera, Tell Mabtuh Sharqi, and Khirbet Malhat providing the main evidence for flourishing habitation (see Fig. 1.5). These remarkable sites are strikingly prominent, such that “even today, with industrial scale agriculture and support systems, there are no settlements comparable to those of the third millennium [BC]” (Hole 1997: 52). Yet they are by no means the only variety of settlement during this period, with surveys and other archaeological investigations uncovering a plethora of smaller towns, villages, hamlets, forts, farms, and homesteads also (e.g. Danti 2000: 261-281; Hole & Kouchoukos 1995: 7-8; Pruß 2005). This period of widespread habitation and the emergence of complex organised systems did not last, however. Starting near the end of the EBA, a decline in settlement, as seemingly sudden as their establishment several centuries earlier, took place, with both large tells (including the “Kranzhügel”) and small settlements undergoing the same rapid abandonment (Hempelmann 2013: 271-276; Meyer 2009, 2010a; Pruß 2005). Though some Middle Bronze Age (MBA), Late Bronze Age (LBA), and Iron Age occupations of the area do exist, this renewed dearth of human settlement largely lasted until the Roman/Sassanian presence in Northern Mesopotamia (ca. 2nd-7th century AD) took shape more than two millennia later (Hole & Kouchoukos 1995: 9-10).

This data is gathered from a variety of sources (see Section 3.3.3), a large proportion contingent on investigations on the perimeter of the GWJ having ventured into its interior. When these have deemed this “peripheral” landscape to be worth fieldwork enquiry, they have consistently provided tantalising glimpses of an unexpectedly relatively rich archaeological landscape not merely confined to the well-known (though not well-researched) “Kranzhügel”. This pattern of investigation is well illustrated by von

Oppenheim's early explorations in the region. After an initial 1893 journey that skirted the southern and eastern edge of the GWJ, largely sticking to river valleys, he wrote:

> "*Das grosse Gebiet zwischen dem mittleren und unteren Chabur und dem Belich ist noch von keinem Europäer durchzogen worden und gänzlich unbekannt. Aller Wahrscheinlichkeit nach ist der südlichste Strich dieses Landes ebenso* [*archäologisch*] *steril wie die Gegend südöstlich des Singar und des Chabur. Dasselbe dürfte für den südlichsten Teil der Ebene von Serug, der Landschaft zwischen Belich und* [*Euphrat*], *gelten.*"[3] (von Oppenheim 1900: 3)

Six years later, von Oppenheim made his first journey into the interior of the GWJ, after which his assessment of its archaeology is radically altered:

> "[*Es erscheint, dass*] *die Sage der* [*archäologischen*] *Sterilität des Zwischenstromlandes von Mesopotamien zwischen dem Chabur und dem Belich und dem Euphrat gänzlich abgethan* [*ist*]."[4] (von Oppenheim 1901: 91)

However, the "myth" of the lack of widespread archaeology in the GWJ, especially its southern areas, continues to this day nonetheless. Thus it is imperative that, after over a century, von Oppenheim's assertion of the archaeological fruitfulness of the region is investigated and brought into mainstream academic discourse of the Mesopotamian region. From the albeit limited data available, it appears that the most significant period of human occupation, both in terms of density and settlement manifestation, is the EBA; to which the waxing and waning dynamics of the preceding LC are an integral precursor.

Section 1.2: The Landscape of the Greater Western Jazira

1.2.1. Overview and Context

1.2.1.1. Semi-Arid to Arid Steppes in Northern Mesopotamia and the Levant

Northern Mesopotamia is situated largely within the well-known "Fertile Crescent" of the Near East; that region where annual precipitation is sufficient for rainfed agriculture (Fig. 1.2). However, it also encompasses large sections of relatively flat semi-arid limestone plains, which spread south from the fertile areas of northern Syria and northwestern Iraq towards the arid Syro-Arabian Desert of the Levant (specifically central-

[3] "[The large region between the middle and lower Khabur and the Balikh has not yet been traversed by any European and is completely unknown. In all likelihood, the southernmost area of this land is equally archaeologically sterile as the region southeast of the Jebel Sinjar and the Khabur. The same should apply to the southernmost part of the Sarugh Plain, the region between the Balikh and the Euphrates.]"

[4] "[It appears that the myth of the archaeological sterility of the interfluvial region of Mesopotamia between the Khabur and the Balikh and the Euphrates is completely exploded.]"

southern Syria and Jordan). This dry zone covers a vast area of ca. 600,000 km^2 in a topography ranging between 1736 metres above and 400 metres below sea level (the latter along the shores of the Dead Sea), mostly receives less than 150 mm annual rainfall, and stretches as far south as the Arabian Desert of the eponymous peninsula (Laity 2008: 24-28). Though consisting mostly of a sedimentary rock landscape known locally as the Hamad, Tertiary and Quaternary basalt plains, such as the Harra in southern Syria, northeastern Jordan, and northwestern Saudi Arabia (see Section 5.4.1.2), also cover large areas. Additionally, occasional volcanic hills are found in this region, notable examples of which exist within the GWJ (Wilkinson 1997: 69; Section 1.2.2.1). Other, larger mountain ranges along the Mediterranean coast and southern Anatolia act as rainshadows, additionally increasing aridity (Kalayci 2013: 10-11; Laity 2008: 24).

Within Northern Mesopotamia lies the Jazira (literally "the island", i.e. between the Euphrates and Tigris rivers), which forms an alluvial plain of undulating steppes ranging between ca. 350 and 500 metres above sea level (a.s.l.) and comprising well-drained soils situated on either limestone bedrock or Quaternary alluvium and colluvium (Kouchoukos 1998: 319-326). Such a landscape creates high agricultural potential, limited almost exclusively by the availability of water sources. This is more often than not scarce however, as although its highest average annual rainfall estimates correspond to the heartland of the Fertile Crescent at a substantial 500-700mm, the Jazira largely encompasses drier areas, with its southern boundary located beyond the 150 mm isohyet along the Middle Euphrates (Wilkinson 1997: 69-73).

1.2.1.2. Defining the Greater Western Jazira

A subset of the Jazira region, the GWJ is largely defined by the courses of the only tributaries of the Euphrates in Northern Mesopotamia: the Khabur and the Balikh (Fig. 1.6). The former of these, together with the Euphrates itself, encloses the steppe in question on three sides (west, south, and east). The northern boundary of the GWJ is for the purposes of this thesis defined by the modern Syro-Turkish border. While such a recently-imposed artificial boundary could rightly be considered an arbitrary definition for a geographical region, it is in this case the best choice for a variety of reasons. Firstly, it roughly matches the transition zone from semi-arid steppe to well-watered plain (see Section 1.3), and between 20 and 50 km further north, the Taurus Mountains. Secondly, in the absence of clearly defined natural borderlines such as river courses, any other northern boundary selected, such as a rainfall isohyet or latitudinal line, would be equally as arbitrary. Lastly, keeping the entirety of this study within a single country has advantages when it comes to incorporating ground truth data, as these also are confined to one country per project. Thus rather than attempting to incorporate disparate fieldwork operating under different administrative stipulations, utilising only projects based within Syria creates a more readily comparable dataset.

The term “Western Jazira” (or “West Jazira”/“Westjazira”) has for some time been used to describe the region between the Balikh and Khabur by those working within it (see e.g. Hempelmann 2013; Kouchoukos 1998; Pruß 2013b; Meyer & Orthmann 2013). Although the definition of the Balikh as the Western Jazira’s western boundary is clear in the above sources, the term has also been used for the region between the Euphrates and Balikh (Einwag 1993, 1993-94, 2000). In order to more precisely delineate the total region of study from its sub-regions, I have used the term “Greater Western Jazira” (abbreviated to GWJ) to refer to the entire Syrian region between the Euphrates and Khabur (Fig. 1.1). While the area between the Euphrates and Balikh is descriptively referred to as the “Euphrates-Balikh steppe” (or variants thereof), the term “Western Jazira” has been retained to specify the area between the Balikh, Khabur, and Euphrates alone. To avoid potential confusion with the acronym GWJ, “Western Jazira” has been written out in full throughout.

1.2.2. The Current Landscape

1.2.2.1. Overall Geography

The GWJ is largely comprised of a lightly undulating landscape in keeping with the majority of the Hamad. East of the Balikh, the semi-arid to arid steppe rises between ca. 250 and 400 metres a.s.l. from south to north, respectively. This topography is broken by two major uplands: the Jebel Abd al-Aziz and the Tual ‘Abah (Fig. 1.6). The former forms a 60 km long east-west running anticline ridge that measures only ca. 15 km across, reaching a maximum elevation of some 900 metres a.s.l. This very prominent range acts as the region’s major watershed, with seasonal wadis flowing north and south from it (Kouchoukos 1998: 346-348). The latter is a less clearly-defined sprawling upland, measuring some 30 km in diameter, and rising to 640 metres a.s.l. Additionally, a couple of volcanic outcrops exist, forming the Menachir mountains in the southwest and the el-Homma mountains to the east, both ca. 360 metres a.s.l.

West of the Balikh, the landscape is somewhat different, with a greater variation in elevation from ca. 275 metres a.s.l. in the southeast to 600 metres a.s.l. in the northwest. Three exceptions to this general topography exist. In the northwestern corner of the GWJ

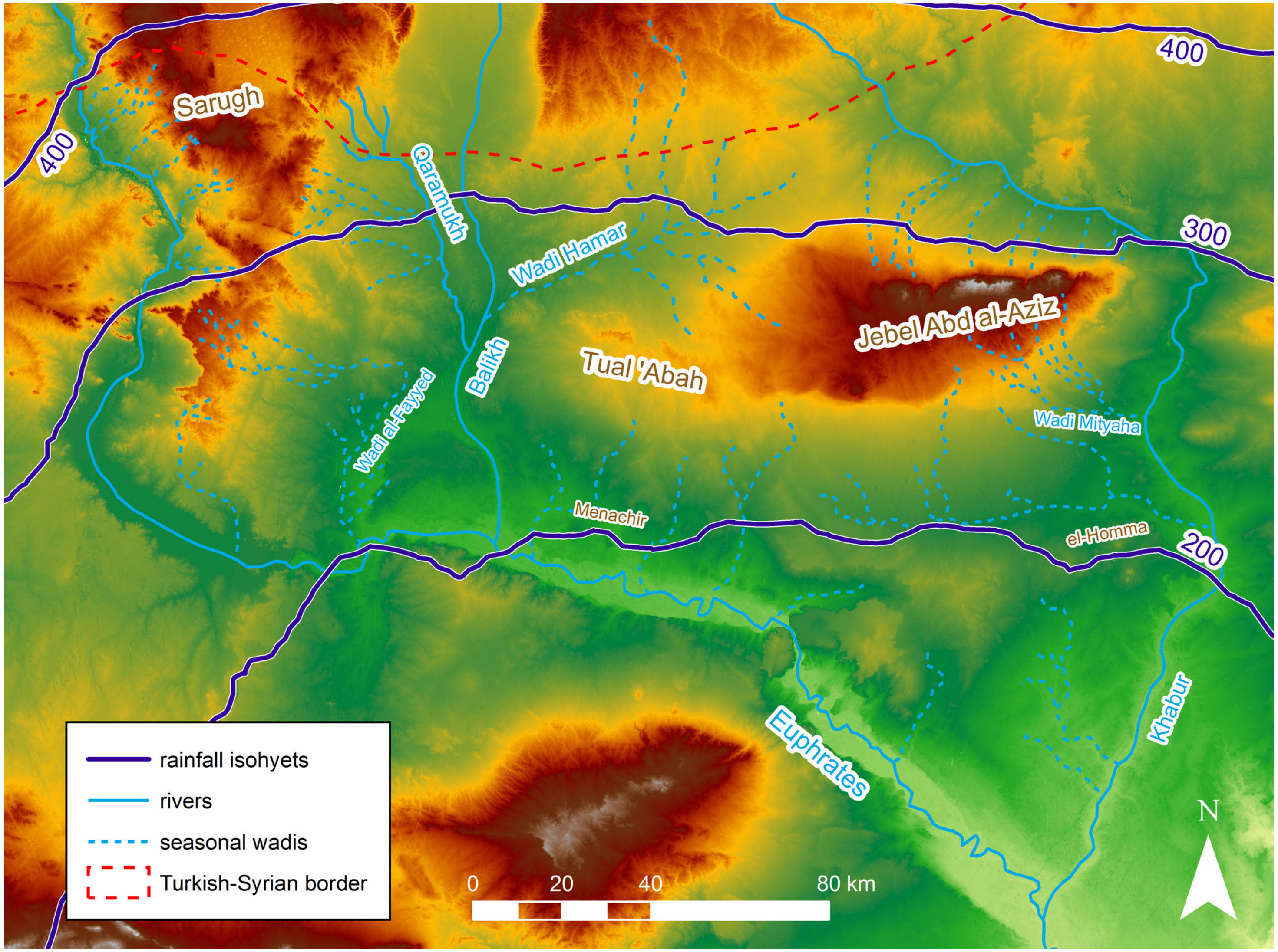


Figure 1.6: ASTER map showing geographical features of the GWJ. Rainfall data from the GPCC, processed by Louise Rayne. Seasonal wadis traced from Danti 2000: Fig. 6.1a; Kouchoukos 1998: Fig. 7.10; Moorgat-Correns 1972: Karte II.

lies the Sarugh plain, a plateau-like upland of which ca. 1500 km^2 are situated within Syria at around 450 metres a.s.l., surrounded by higher mountains (Fig. 1.6; Einwag 1993: 27-29). The easternmost part of the Sarugh borders onto the second topographical anomaly, the low-lying fertile plains around and between the Qaramukh and Balikh rivers. This area covers ca. 1000 km^2 at an elevation of around 310-360 metres a.s.l. Lastly, a prominent valley runs from the southwest edge of the Balikh-Qaramukh plain in a southwesterly direction to within 30 km of the Euphrates. Surrounded by mountains of around 400-420 metres a.s.l., the basin of this valley averages 370 metres a.s.l.

The soils of the undulating plains of the GWJ are, as in the rest of the Hamad, generally favourable for agriculture, being largely loose and well-drained, and having developed on limestone bedrock and Quaternary alluvium, with some more recent fan deposits emanating from the Jebel Abd al-Aziz (Kouchoukos 1998: 350-356). However, soils on the slopes of that mountain, with steep inclines and an abundance of gravel inclusions, and its close surroundings, with high gypsum content, are far less favourable for agriculture, though this is mitigated in small pockets by perched aquifers (see Section 1.2.2.3). The same, however without the existence of aquifers, is true of the southern triangle of the Western Jazira. Meanwhile deep, fairly fine-textured soils with some of the best agricultural potential, given access to water, are those immediately south of the Jebel Abd al-Aziz (*ibidem*). West of the Balikh, favourable soils prevail, though over much of the region their existence is mitigated by the inclines and rocky outcrops of the uplands. These mountains, however, also allow silt deposits to be brought downhill by rainwater into the small sections of deep level soils that do exist, making them particularly suitable for agriculture (Danti 2000: 266-267).

1.2.2.2. Climate

The GWJ is largely situated within a region of low precipitation and high inter-annual variability, though modern rainfall estimates vary somewhat depending on the data sources used (see Fig. 1.7). This is often due to a high level of clustering of wet and dry years (see below), which can skew short and medium-term observations (Weicken & Wener 1995: 283). Eugen Wirth (1971: 88-93) calculates average annual values for the 30-year period from 1937/38 to 1966/67 based on admittedly incomplete data from ground monitoring stations. Missing yearly values from any one of these were averaged out using measurements of neighbouring stations. Paul Sanlaville (2000), on the other hand, uses various data from the 1970s to the 1990s to produce rainfall isohyets based on “typical”

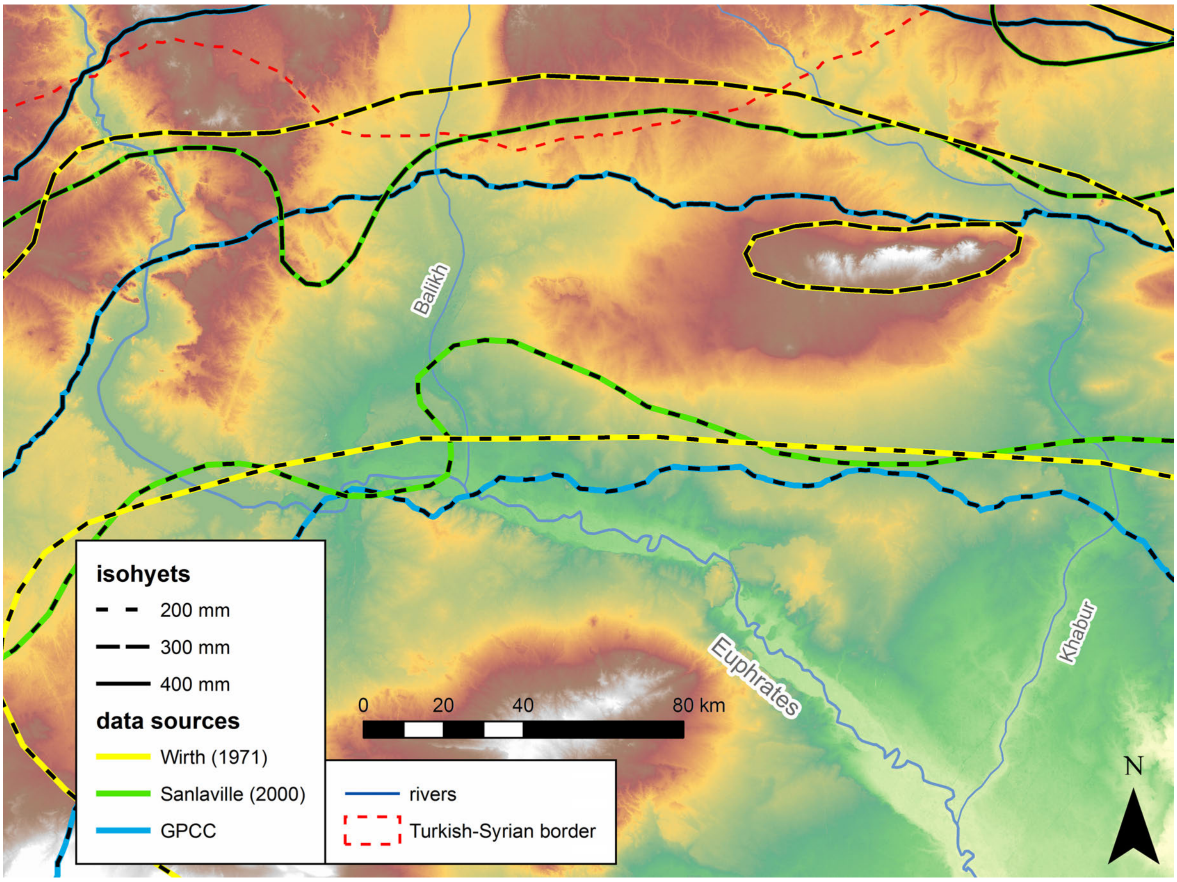


Figure 1.7: ASTER map comparing different modern-day rainfall estimates in the GWJ.

average, wet, and dry years, without averaging actual measurement values. As does Wirth, Sanlaville (2000: 9) also laments the inadequacy of the available data due to irregularities in data gathering techniques.

More recently, the Global Precipitation Climatology Centre (GPCC), operated by the Deutscher Wetterdienst, has been investigating past and monitoring present rain gauge measurements worldwide since 1989 to produce interpolated isohyet values (Schneider *et al.* 2011). Their highest-accuracy "Full Data Reanalysis" dataset consists of monthly precipitation values from January 1901 to December 2010; however these vary significantly in accuracy. Therefore Louse Rayne of Durham University has extracted a subset of this data for Northern Mesopotamia narrowed down to a 31-year period from 1980 to 2010, as this is both a range sufficient for analysis and comprises the more accurate most recent readings (Rayne 2014: 153-156)[5]. These constitute probably the most accurate modern rainfall estimates for the region, and are thus used throughout this thesis.

Although considerable variation between the estimates listed above exists across Northern Mesopotamia, they correlate relatively well in the GWJ (Fig. 1.7). The region ranges from receiving 375 mm annual rainfall in the Sarugh plain of the northwest to 145

[5] These were subsequently processed by Rayne to adjust for annual values, and interpolated to allow an understandable visualisation in ArcGIS mapping software. For a full breakdown of the processes involved, see Rayne 2014: 151-162.

mm in the far south; however nearly three quarters of the region falls between the 320 and 200 mm isohyets. One major exception to this pattern is that Wirth considers the Jebel Abd al-Aziz to form an inset region of significantly higher rainfall; consistently over 300 mm. This may well explain the relatively large amount of surface runoff that charges wadi systems flowing down either sides of this mountain (see next section). Other characteristics typical for a semi-arid landscape with such precipitation levels are heavy rains limited to a single season, high wind speeds, a low humidity, and very high evaporation rates during the dry months (Weicken & Wener 1995: 283-284). All are present in the GWJ, with rainfall almost exclusively restricted to winter or spring (ca. between January and April), and a dry, dusty climate predominating the remainder of the year (Wirth 1971: 69).

Average precipitation figures do not present a full picture of the GWJ, however, as the severity of inter-annual fluctuations in rainfall in the region have a strong effect on its climate (Sanlaville 2000; Wirth 1971: 97-99). As with the above, values for fluctuations vary depending on the sources consulted; however they are uniformly high. Sanlaville (2000: 11-12) estimates precipitation values to depart from their norm by ca. 45-50% in regions of 300 mm average annual rainfall, and by more in regions of lower average rainfall. This constitutes at least three years in ten in which precipitation is insufficient for rainfed agriculture. More recently, Rayne (2014: 155-156) has used the monthly values from GPCC data to calculate variability of 30 to 40% within the GWJ, increasing from north to south. This supports the evidence that variability increases as average conditions become more arid (Wilkinson 1997), which links with data that suggests the percentage of years in which no rainfed agriculture is possible ranges from 1% between the 350 mm and 250 mm isohyets to 64% south of the 200 mm isohyet (Oram & de Haan 1995: 26-27, Tab. 3.1). These variations generally come in both short and long batches, with strong offsets from averages lasting several years (e.g. 1957-1963: 33% lower than average) and weaker offsets lasting several decades (e.g. 1891-1920: 6% higher than average; Wirth 1971: 88-99). These "dry" and "wet" periods have differing levels of impact across Northern Mesopotamia, but generally affect all locations to some degree at least (Wilkinson 1997: 69-70). Conversely (rare) rainfall occurrences during arid periods are often *very* localised (Wirth 1971: 69-71). These combined factors cause dry years in semi-arid locations such as the GWJ "*nicht selten ein katastrophales Ausmaß [anzunehmen]*"[6] (*ibidem*). This makes crop failure a frequent possibility, at best occurring one out of every three to six years (Wilkinson & Hritz 2013: 17-18). As to be completely risk-free rainfed cultivation in Syria needs to be located above the 400 mm isohyet (Wirth 1971: 88-93), all agriculture

[6] "[to not rarely take on catastrophic proportions]"

conducted within the GWJ carries at least a modicum of uncertainty. This ties in with the econoclimatic zones described in Section 1.3.

1.2.2.3. Surface Water Sources

Surface water is consistently scarce across the entire GWJ, however not uniformly so. Rivers and streams provide ample water sources to the perimeter of the region, as well as the Balikh valley. However, in the inner steppe regions, only the Qaramukh, fed by numerous watercourses carrying surface runoff from the relatively high-rainfall Sarugh to the west, carries water all year round; this accounts for the fertility of the narrow area (at most 13 km wide) between the Balikh and it (Fig. 1.6; Einwag 1993: 27-29). All other wadi systems are strictly seasonal, the largest example of which is the Wadi Hamar in the northern Western Jazira. This system is watered by tributary wadis from both the Taurus mountains to the north and the Tual ‘Abah to the south, creating a large area of seasonally well-watered plains covering around 2000 km^2 (Weicken & Wener 1995: 281-283). Rainfall on the latter uplands also periodically charges a handful of wadis flowing south-southwest to the Euphrates. From the Jebel Abd al-Aziz, surface runoff flows north/northeast to the Upper Khabur, and south via several small wadis that join to form the Wadi Mityaha, which empties into the Lower Khabur to the southeast (Hole 1997: 44-46; Kouchoukos 1998: 346-348, 383-386). In the southern Euphrates-Balikh steppe, a handful of small wadis run roughly northwest to southeast for ca. 40 km, most of which combine to form the larger (though still highly seasonal) Wadi al-Fayyed, which in turn flows to the Euphrates (Danti 2000: 266-267; Einwag 1993: 27-29). Lastly, several small wadis run southwest from the Sarugh directly into the northern Middle Euphrates, a distance of only around 10 km.

Groundwater is relatively abundant in the Jazira, and unlike in the remainder of Syria and Lebanon consistently present across the entire region (Wolfart 1967: 231). However, depth levels vary greatly between being easily accessible and completely inaccessible to hand-dug wells (Kouchoukos 1998: 346-350). This has significant effects on settlement, as evidenced by a number of abandoned modern-era villages around the Jebel Abd al-Aziz, all of which are either dry or carry only brackish water in their wells (Hole 1997: 44). The Wadi Hamar and Jebel Abd al-Aziz foothill areas are some of the most favourable regions for well construction, with groundwater reachable between 5 and 20 metres below the surface in the former region, while underground aquifers perched above the regional groundwater table run less than 12 metres below the latter (Kouchoukos 1998: 379-386). Further south, groundwater continues to be relatively accessible, with good-quality sources noted at 20 to 25-metre deep wells near the sites of Khirbet Malhat and Tell Zahamak by Musil (1927: 87-89) during his early travels (see Fig. 1.5; Smith & Wilkinson in press). Furthermore, at a few locations in the southern Western Jazira such as around the site of Tell Sha'ir, gypsum sinks and perched aquifers provide water access at a particularly shallow depth (Kouchoukos 1998: 386-387). In the southern Euphrates-Balikh steppe, there is a strong correlation between the locations of pre-modern wells and tell settlements, indicating a relatively unchanging accessibility of groundwater also (Danti 2000: 267-268, 272). Water can additionally be brought to the surface naturally via springs, of which a significant number exist along the northern and southern flanks of the Jebel Abd al-Aziz, most producing flows of several litres per second at least (Kouchoukos 1998: 348-349).

1.2.2.4. Vegetation

The natural modern-era vegetation of the GWJ is practically impossible to observe in the present day, as overgrazing and wood cutting for fuel over the last century, as well as near-total agricultural cultivation by the widespread use of diesel-powered water pumps since the 1950s has largely destroyed its original flora (Hole 1997: 42-46; Kouchoukos 1998: 356-358; Weicken & Wener 1995: 283-284). Sparse botanical data along with photographs taken by early explorers such as von Oppenheim reveal a previous landscape of low grasses, in some areas regularly dotted with large tufts of grass[7] and occasionally interspersed by larger shrubs[8], across the GWJ (see Moortgat-Correns 1972: Tafel XXIV-XXXI). In the uplands of the Jebel Abd al-Aziz, von Oppenheim (1901: 91-92) came across large pistachio trees of the *pistachia atlantica* species (*butm* in Arabic), whose wood was used for construction and edible fruit to produce oil. Further species of pistachio[9] as well as one species of almond[10] have been recorded on this mountain also, while in some parts of the uplands of the Balikh-Euphrates steppe, different flora such as sage[11] prevailed (Wirth 1971: 122-123).

1.2.3. Past Climate and Environment Reconstructions

The palaeoclimate of late 5th-3rd millennium BC Northern Mesopotamia has been the subject of much academic debate for around the past 25 years (brief overviews in Kalayci 2013: 13-17; Lawrence 2012: 23-24; Wossink 2009: 15-26). This has several reasons. The

[7] Likely *stipa lagascae* and *stipa capensis* (Mediterranean steppegrass); see Wirth 1971: 123.
[8] Likely *achillea conferta*; see Kouchoukos 1998: 360.
[9] *Pistachia khinjuk*
[10] *Amygdalus orientalis*
[11] *Phlomis damascena*; also *achillea santolina* and *astragalus*

first problem is the varying results that different sources of palaeoclimatic proxy records provide. Such data has been obtained from, amongst other sources, speleothems in Soreq Cave in Israel (Bar-Matthews & Ayalon 2011), varves in Lake Van in eastern Turkey (Wick *et al.* 2003), the level of the Dead Sea (Kagan *et al.* 2015), sediment cores in the Gulf of Oman (Cullen *et al.* 2000), and pollen cores at Lake Buara in eastern Syria (Gremmen & Bottema 1991) and Lake Tiberias (Finkelstein & Langgut 2014)[12]. These feature very varied temporal resolutions, often only localised records, significant sequence gaps, and methodological discrepancies (Riehl *et al.* 2012: 119; Wossink 2009: 22-24). Thus the Soreq, Van, and Dead Sea data show complementary, though slightly asynchronous, fluctuations in precipitation levels during the LC-EBA, while results from the Gulf of Oman show less drastic longer-period variations and those from Lake Buara suggest hardly any significant changes to have occurred at all. In addition, a handful of geoarchaeological investigations at sites and other locations around Northern Mesopotamia, with the closest to the GWJ being the vicinity of Tell Mozan in the Upper Khabur (see Fig. 1.4; Deckers & Riehl 2007). These corroborate evidence for climate fluctuation to varying extents, but are universally of a low, discontinuous temporal resolution (Wossink 2009: Table 2.2).

Another major issue is the applicability of such proxy records to specific locations of archaeological investigation. Since the trends they record are strictly large-scale, using their data overlooks specific details on local conditions, especially as these were probably more affected by their year-on-year fluctuations (see Section 1.2.2.2) than general climate change events (Kalayci 2013: 16-17). Furthermore, instances of palaeoclimate datasets are relatively rare and thus spread out wide, with the closest to the GWJ (Lake Buara) located 80 km from its eastern boundary – and even that dataset is subject to the specific uncertainties of pollen data, which can conflate effects of human land use with those of climate (see Roberts 2014: 33-40). Thus their applicability to the region and time periods of this study is questionable at best, and indeed the very existence of large-scale ancient settlement systems in areas that are semi-arid to arid in the present day may remain the most compelling argument for a different (i.e. wetter) climate in the past (see e.g. Hole 1997: 56; Section 2.1.4.5). Nevertheless, some potential general trends for Northern Mesopotamia and the Levant evidenced across all available data are outlined below, providing if nothing else an overview of the academic postulations and debates surrounding the palaeoclimate of the region.

[12] For a full overview of data sources for palaeoclimate in the Near East, see Kuzucuoglu 2007: 464-467.

For the LC-EBA period, the most significant trend is mostly wet conditions during the early-mid 3rd millennium BC and increasing aridity towards the end of that millennium. The former of these is marked by the ceasing of a highly fluctuating climate during the late 5th-4th millennium BC (punctuated by numerous arid spells), with more stable, agriculturally favourable conditions apparent from ca. 3000 BC onwards. Evidence for this comes from the Soreq Cave, Dead Sea, and Gulf of Oman, though short arid spikes around 3000 and 2700 BC also occurred at the former of these (Wossink 2009: 24-25). Sparse palaeobotanical data also supports more humid conditions during the EBA, with evidence for dense poplar and tamarisk forests along the Balikh, Khabur, and Euphrates rivers (Weicken & Wener 1995: 284). More recent research based on samples from Mozan, Leilan, Bderi, Jerablus, and Emar has revealed open-park woodland to have existed across roughly the northern half of the GWJ (ceasing south of the 250-200 mm isohyet; see Fig. 1.6) during most of the early-mid EBA, consisting of mainly pistachio and almond trees, with some deciduous oak in the northernmost areas (Deckers & Pessin 2011).

Meanwhile, a preceding arid spell at the end of the 4th millennium BC[13] has been interpreted by some as a rapid climate change (RCC) event (e.g. Courty 1994: 47-50; Weiss 2003). This "5.2 k BP event" is argued to have severely decreased precipitation and have had a major effect on the environment, leading to several socio-political events such as, in Northern Mesopotamia, the collapse of the Uruk "colonies", precipitating local settlement growth (Weiss 2000: 77). Certainly this period saw effects on a global scale, however as a subset of a larger 6000-5200 BP dry event, which saw two peaks of aridity. Of these, the "5.2k BP event" was the shorter and attenuated by a general trend towards a wetter climate (Bar-Matthews & Ayalon 2011: 169). Thus though drier conditions than the subsequent early-mid 3rd millennium BC are not in significant dispute for the late 4th millennium, it was not necessarily an RCC event, and its effect on populations and societies is up for debate.

Evidence for the second major general observable trend, towards arid conditions by the end of the 3rd millennium BC, is somewhat more conclusive. Results from the Soreq Cave, Lake Van, Dead Sea, Gulf of Oman, Lake Tiberias, and several of the geoarchaeological investigations show such a climatic tendency around 2500-1800 BC, though not all over the same time period or to the same extent (Kalayci 2013: 13-14; Riehl 2009: 95-96; Wossink 2009: 24-25). Additionally, pistachio remains disappear from the palaeobotanical record of the central GWJ latitudes during this time, perhaps indicating a northward

[13] 5250-5170 BP as measured at Soreq Cave (Bar-Matthews & Ayalon 2011: 169).

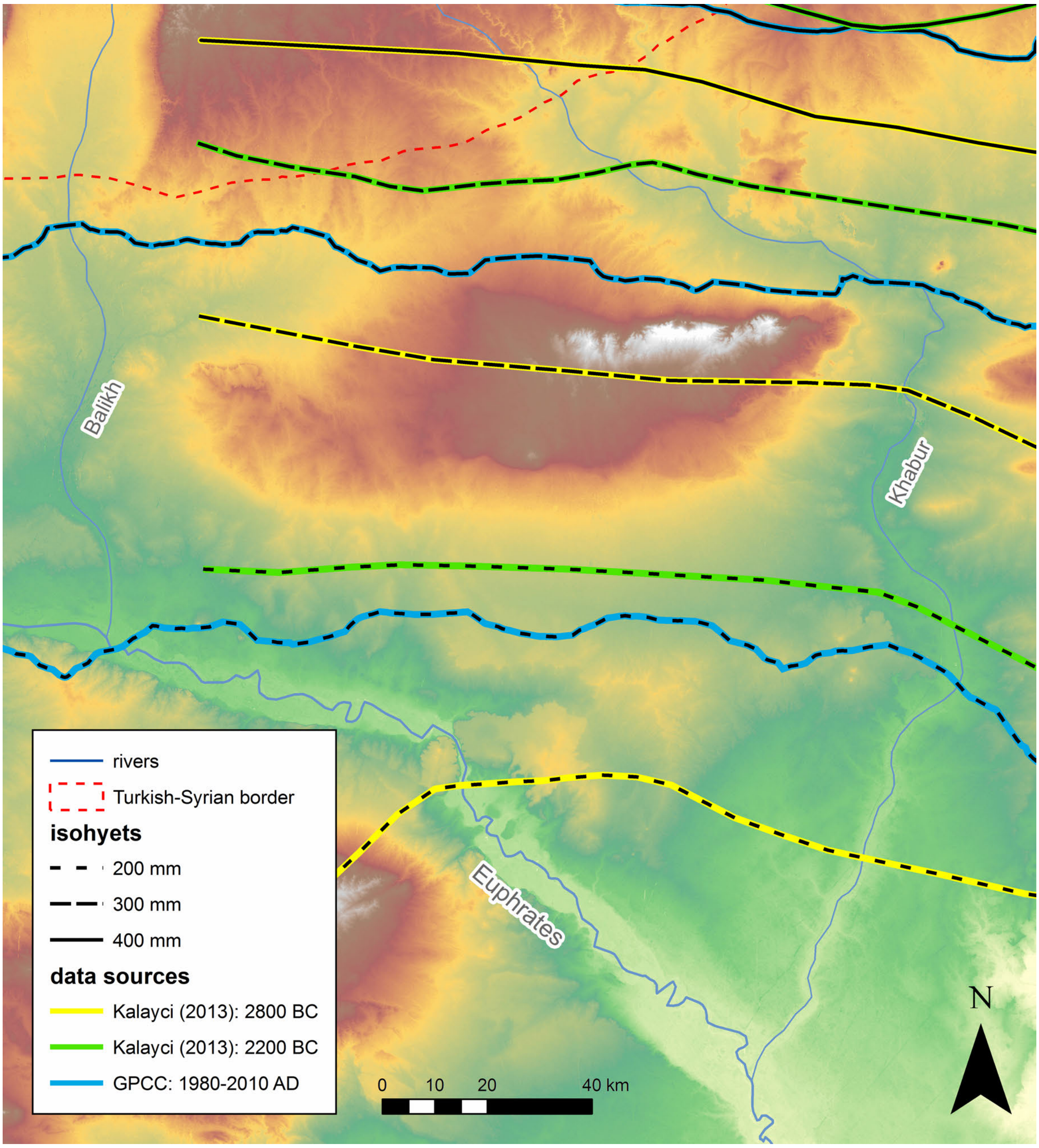


Figure 1.8: ASTER map of the eastern end of the GWJ comparing estimated modern-day and reconstructed potential ancient average annual precipitation isohyets based on Kalayci (2013: Fig. 5.15).

retreat of open-park woodland (Deckers & Pessin 2011: 39-41). The peak of this dry period[14] has been termed the "4.2 k BP event", and interpreted to have affected the climate of Northern Mesopotamia to varying degrees (compare Kuzucuoglu 2007; Riehl 2008; Weiss 2000). On the one hand, the Leilan Climate Change Model (LCCM) proposes this to have been a short phase of intense aridification occurring around 2200 BC (or, as suggested by Courty [2001], 2350 BC) – possibly caused by a volcanic eruption – that precipitated global social change and settlement collapse, heralding the end of the EBA

[14] At around 4200-4050 BP as measured at Soreq Cave, albeit at a low 20-year resolution (Bar-Matthews & Ayalon 2011: 169); 2300 BC as measured at Lake Tiberias (Finkelstein & Langgut 2014: 222-223).

(Weiss 2000). The proxy data used to propose the LCCM present a variety of problems, however, as numerous uncertainties in the measuring and identification of tephra sediments (indicating volcanic activity), the contemporaneity of these layers with potentially more arid conditions, and the evidence for a causal link between the two render it unreliable as a solid indicator of late 3rd millennium BC environmental processes (see Wossink 2009: 20-22 for a brief overview). Furthermore, even if a prolonged dry spell during this period can be considered likely (see e.g. Riehl *et al.* 2008; Riehl 2009: 95-96), the precise timing of a rapid peak (or several[15]) has yet to be determined, as does its impact on local environments, especially as the event has not been measured at all locations containing appropriate proxy records (Kalayci 2013: 15-16).

Nevertheless, even in the absence of an RCC event, the climate of the period around 4.2 k BP appears to have been distinct from that of the earlier 3rd millennium BC. This is illustrated by reconstructed ancient isohyets for Northern Mesopotamia by Kalayci (2013: 109-111), who calculates the "critical line" of 200 mm average annual precipitation to have reached its northernmost position between 4.2 k and 4.1 k BP – a shift on the ground of ca. 40-50 km compared to early 3rd millennium BC values (Fig. 1.8). Furthermore, potential heterogeneous localised manifestations of a general climate trend would likely have affected populations in Northern Mesopotamia all the more, as with increased temporal and spatial clustering of more intensive low and high precipitation levels, "the effect of dry seasons on agricultural production may have been drastic" (*ibidem*: 17). However, it must be re-emphasised that in the absence of a greater number of localised proxy data for Northern Mesopotamia, and the GWJ in particular, conclusions based on the effects of climatic variations on past societies and settlements must be treated with extreme caution (see Section 3.3.4).

1.2.4. Landscape Transformation Processes

Several factors can affect the preservation of traces of human activity in any landscape, the main ones being alluvial or colluvial deposits carried by water or wind (Lawrence 2012: 36-37). These can not only alter the modern archaeological record so as to obscure parts of ancient features, but in some cases entirely bury smaller settlements. Such processes are not always natural, however, with consistent re-occupation of sites and/or their surroundings over successive time periods creating "landscapes of destruction" in fertile regions such as the Khabur Valley (see Figs. 1.1 & 1.2; Wilkinson *et al.* 2004: 192).

[15] Kuzucuoglu (2007: 474) suggests two arid peaks separated by a humid phase occurring between 2250/2150 and 2050/1900 BC.

In particular, the Roman/Byzantine and Islamic eras saw the greatest transformations occur in Northern Mesopotamia, with unprecedented agricultural spread, as well as the development of new intensive irrigation and terracing methods (Lawrence 2012: 309-310).

The GWJ, however, is mostly free of natural transformation processes, leading to a good preservation of the archaeological record. With low precipitation levels, large soil deposits on top of ancient features are rare, with an exception being late 5th-early 4th millennium sites in the Jebel Abd al-Aziz region (Hole 1997: 48-50; see Section 2.1.4.5). Some sites such as Tell Chuera have undergone some erosion on account of being located on the banks of meandering wadis, though this is mostly minimal due to the very seasonal nature of these watercourses. Additionally, aeolian depositional processes have the potential to obscure features in the GWJ. These have a great effect in the present day across the entire region; however this is largely due to the degradation of the landscape due to modern agricultural spread (see below; Weicken & Wener 1995: 303-304). In the past, the intensity of wind-driven transformations is likely to have been less, with the majority probably occurring in its southernmost regions where the very arid soils and comparative lack of vegetation contributed to such processes. Meanwhile, past human-driven transformations are low, as the very intermittent nature of occupation of the steppe mitigates their effect to a large extent. High levels of human activity in the GWJ are mostly constrained to the EBA and Iron Age, and not the later periods that had such a large effect elsewhere in Northern Mesopotamia. Exceptions such as Islamic-era Raqqa and Medinet al-Far (see Fig. 1.5) exist, but these are mostly confined to the vicinities of river valleys and not the interior of the region.

Present-day human processes are often far more rapid and widespread than during the past, greatly increasing the chances of affecting archaeological features (Wilkinson *et al.* 2004: 196). The current proliferation of intensive agriculture across the vast majority of the GWJ is a prime example of this, and has indeed been destructive on a large scale, most notably to the region's vegetation (see Section 1.2.2.4). However, as these processes only commenced in the 1950s, their effects have so far been relatively small, with some flat settlements obscured, but mounded EBA sites generally only slightly, if at all, affected[16]. Additionally, tell mounds are often quite obviously heritage features in appearance, and are thus amongst the earliest and clearest sites to have been placed under conservation orders by the Syrian Directorate-General for Antiquities and Museums (DGAM; Zobler 2014). Regrettably, during the current wartime situation in the country, such theoretically protected sites are being disturbed and sometimes destroyed to an ever greater extent

[16] For a full analysis of present-day destructive processes on ancient sites in Northern Mesopotamia, see Cunliffe 2013.

(Cunliffe 2012). Nevertheless, a very high proportion of the archaeological record of the GWJ remains fairly intact.

Section 1.3: Econoclimatic Zones

1.3.1. Definitions and Overview

The Northern Mesopotamian-Levantine region can be divided into three distinct zones corresponding to climatic regions that can be used as interpretive frameworks with which to discuss prevailing economic practices. These zones are nominally defined by precipitation isohyets, but in actuality correspond to agricultural potential on the ground (Fig. 1.9; Wachholtz 1996: 5-9; Wilkinson 2000b: 3-4). At the two extremes lie the moist *zone of stable settlement* to the north and the *zone of aridity* to the south (Smith *et al.* 2014: 154-159). In the former of these, diversified rain-fed agriculture is feasible, with prevalent wheat and barley farming being mixed with lentils, vineyards, and in the more Mediterranean climate of western Syria, olives (Wilkinson *et al.* 2014: 53-54). While still affected by fluctuations in precipitation, this zone generally does not see such disruption as to severely affect settlement, which can quickly recover from a minor deficit using ample surplus the following year. It is however not well suited to extensive pastoralism, as grazing areas have to be found in relatively small niches between dense, ubiquitous agricultural land; thus inhabitants may use nearby semi-arid regions for such purposes (Philip & Bradbury 2010: 160-161). The *zone of aridity*, by contrast, comprises an arid steppe where even during the wettest years agriculture is not a sufficient resource with which to sustain settlement. Most commonly, the economic practice employed in this area is mobile pastoralism, with an emphasis on extensive use of grazing land, freely available in abundance, and the flexibility of movement (Wilkinson *et al.* 2014: 53-54). In the recent past, this land was given over to nomadic tribes, with for example van Liere (1965: 27) recording 2,050 Bedu tents west of the Khabur river in 1954.

Between these two zones Wilkinson (2000b: 3-4) has defined a *zone of uncertainty*, where rainfall is erratic, cultivation carries high risks, and agro-pastoral strategies prevail (Smith *et al.* 2014: 154-159). This concept was developed from Wachholtz (1996), who recognised a “zone of transition”, where land use consists of both agriculture and pastoralism. In these regions, a closely integrated system of barley cultivation and large-scale sheep and goat husbandry predominates, with flexible grain-based and wool-based economies constantly shifting their focus towards whichever is more profitable in the climate of any particular year (Smith 2014a: 103-104). Such flexibility might also include

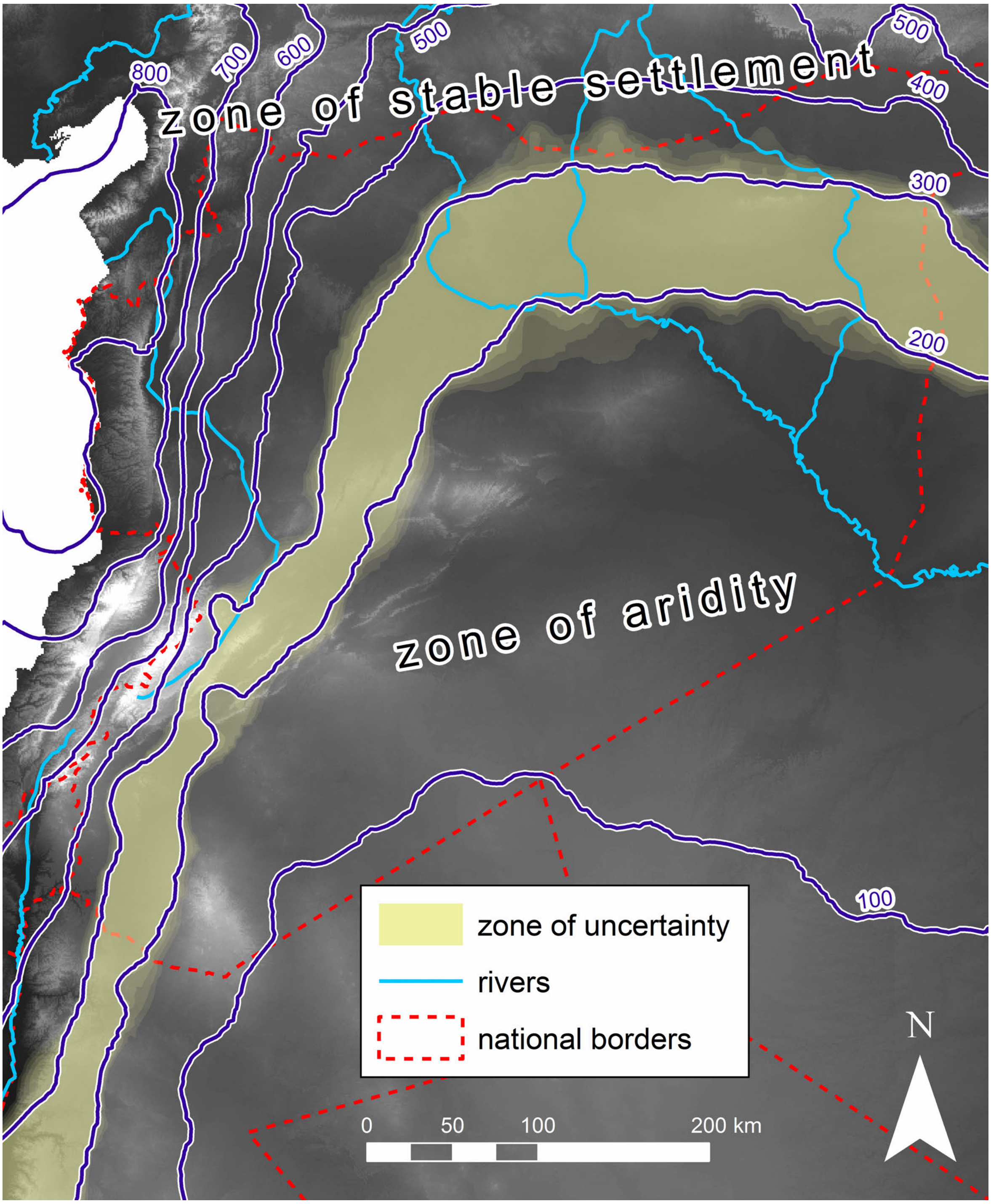


Figure 1.9: ASTER map showing the econoclimatic zones of Northern Mesopotamia. Rainfall isohyet values from the GPCC.

semi-mobility; to use a modern example, higher than average rainfall in 1940s Syria led farmers, largely without mechanised methods, to penetrate deep into the dry steppe to exploit its newfound agricultural potential (Wirth 1971: 97). Archaeologically, the *zone of uncertainty* is defined by few and mostly small settlements before the 3rd millennium BC, while the *zone of stable settlement* sees a long-term progression of pre-EBA sites, relatively abundant by the early to mid-4th millennium BC (Smith *et al.* 2014: 155-157; see also Section 5.4.2).

Though initially defined as being situated between the 180 and 250 mm annual precipitation isohyets by Wachholtz (1996), Wilkinson (2000b, see also 1997: 72-73) expanded the range of the *zone of uncertainty* to 180-300 mm based on the five agro-ecological zones defined by the International Center for Agricultural Research in the Dry Areas (ICARDA) for the Syrian Jazira. More recently, the southern boundary of the zone has been defined less precisely as between 180 and 200 mm annual rainfall (Wilkinson *et al.* 2014: 53-54). Conversely, barley cultivation dominates up to the 325 mm isohyet (Wilkinson 2000b: 4); thus this could be considered its northern boundary. With the *zone of uncertainty* being itself subject to very imprecise definitions, the best estimate is that the area between the 200 and 300 mm isohyets can positively be classed as “uncertain”, while areas north and south thereof can be considered transition zones (see Fig. 1.9). Thus using this definition, this zone accounts for the majority of the landscape of the GWJ, comprising between 60 and 80% of its area.

1.3.2. Risk-Minimising Strategies in the *Zone of Uncertainty*

To allow for the exploitation of this high-risk-high-gain area, and overcoming of economic and social hardships during climatically unfavourable years, a number of potential coping strategies have been proposed. These are mainly geared to mitigating risk by minimising the possible effects of dry years and creating backup systems of sustainability for when needed. Flexible agro-pastoralism as discussed above helps in this regard; however this only provides an economic fallback to pastoral produce, not a subsistence reserve of grain. Growing crops with low moisture demands such as barley is another long-term strategy, yet results in a lack of agricultural diversification that can make communities heavily reliant on trade. Thus further possibilities that benefit farmers in semi-arid regions without significant drawbacks can additionally be employed.

One method is a controlled pre-emptive extensification of cultivated land, which counteracts a low per-hectare yield in dry years and allows for roughly consistent levels of crop production. This process has been successfully modelled using an agent-based system, where an artificial drought of five years was imposed on a hypothetical settlement (Wilkinson *et al.* 2013: 185-189). This resulted in a 50% increase in cultivated land area, which reduced again once normal conditions returned. During the dry period, populations in the model stagnated, but did not fall. Additionally, poor but more extensive crops can provide a bonus for livestock, which have additional grazing opportunities amongst the agricultural land over a larger area (Smith & Wilkinson in press). In this case, low settlement densities are advantageous, as agricultural land can then be expanded without hindrance.

Another strategy is biennial fallowing, known from textual sources to have been practiced in Northern Mesopotamia since at least the Neo-Assyrian period (early 1st millennium BC; Wilkinson 1997: 80-81). This entails leaving some land uncultivated in alternate cropping years, thus causing moisture in the soil to be carried over from one season to the next, retaining a slightly greater water resource and providing a small but significant bonus. Though lower aggregate yields than could potentially be achieved are produced under such a system, it generally remains more stable in climatically unfavourable years (Stewart *et al.* 1993: 69-73). Complementing fallowing practices, the addition of fertiliser in the form of manure or compost can improve crop yields significantly. Organic waste matter in particular can enhance the stability of agricultural systems, with the application of this by grazing animals attested from the late 4th millennium BC onwards (Wilkinson 1997: 81-82). Scatters of seemingly deliberately broken-up sherds found around several sites in Northern Mesopotamia have been interpreted as evidence for manuring also (see Lawrence 2012: 292, with further references).

Section 1.4: Aims and Structure of the Study

The overarching purpose of this study is to bring the total archaeological landscape of the "marginal" steppes of the Greater Western Jazira into the academic discussion of Late Chalcolithic to Early Bronze Age Northern Mesopotamia. To do so, this thesis aims to integrate the full extent of ground truth information available with extensive remote sensing data. Thus it will survey the region to create a holistic dataset of the late 5th-3rd millennium Euphrates-Khabur steppe that is both accurate and precise enough to be able to compare on a level footing with adjacent regions with longer histories of intensive research. Within this remit, the processes behind the proliferation and apparent "collapse" of settlement during this period are a prominent focus, while the issue of "Kranzhügel" settlements will be addressed with a view to narrowing down their definition and properly ascertaining their full scope. Lastly, this thesis hopes to shed further light on the question of "why […] so many large settlements [thrived] in areas now ill suited for rainfall agriculture" (Akkermans & Schwartz 2003: 256), addressing this regionwide phenomenon across Northern Mesopotamia and the Levant by comparing and contrasting its occurrences to attain a comprehensive view of the dynamics at work.

Having introduced the GWJ and some useful concepts for discussing it above, Chapter 2 begins by covering the results and some interpretations of all past investigations that partially or wholly took part within the region. Particular emphasis is placed on extracting evidence on the morphology and dating of sites; crucial data needed to fulfil this thesis' aims. Next, some theories accounting for the large-scale settlement during the EBA, made by those who conducted the fieldwork, are summarised. Lastly, the important issue of chronologies is addressed, and the various versions used by the different projects collated to form one working system for the region.

Chapter 3 covers the methodology used by this thesis to survey the GWJ, detailing all data sources (both ground and remote sensing-based) used and explaining how these were employed in combination to create a feasible process for this investigation. The management of the data collected is also addressed, as is the major issue of "Kranzhügel" morphologies with the laying out of a categorisation scheme developed in the process of conducting this research. This leads into Chapter 4, which comprises a detailed breakdown of the most important results of the investigation conducted, covering all major features identified and providing some preliminary comparative notes on these. A complete list of all features identified by both this thesis' survey and previous investigations is found in the Appendix.

These results are analysed and subsequently discussed in Chapter 5. Settlements and other features identified are examined using a variety of methods to determine overarching patterns, which are compared to other regions. Chapter 6 uses this to propose a reconstruction of LC-EBA human activity in the GWJ and its wider context, and address the implications of this thesis' conclusions on broad issues in Northern Mesopotamian archaeology.

Chapter 2
Prior Research In and Related To the Greater Western Jazira

Section 2.1: Visits and Fieldwork on the Ground

2.1.1. Introduction

Though the Greater Western Jazira has been subject to relatively few past investigations, those that have taken place have led to a wide range of interpretations and perspectives. Enough regional studies have incorporated the GWJ into their analyses (e.g. Kouchoukos 1998; Lebeau [ed.] 2011; Meyer 2009; Wilkinson *et al.* 2014), and these, together with the surveys listed in Sections 2.1.4.4-7, can be compared to the wider region, forming an empirical framework for this study. On top of these landscape investigations, the handful of excavations carried out, discussed in Section 2.1.3, provide further data as well as essential chronological control which can be extrapolated across the region.

2.1.1.1. A Note on Chronologies

The investigations carried out in the GWJ have used a variety of differing archaeological chronologies dependent on the project, as well as the time at which the work was undertaken, all of which are disseminated and standardised in Section 2.3. For the purposes of this section, however, the individual chronologies used by each author have been used to give a sense of the variation and disparity involved in this aspect of archaeological work in the region. To allow for some preliminary comparisons, periods listed are accompanied by the approximate dates they represent. These should be viewed as an indication of the time periods to which various authors have believed certain sites to date, rather than an accurate assessment of major settlements' chronologies, for which a reading of Section 2.3 and Chapter 4 is required.

2.1.1.2. A Note on Fortified Tell Sites

The type of fortified tell settlements generally referred to as "Kranzhügel" (see Section 1.1.2) is in fact an extremely varied group of sites. As will be elaborated on in Section 3.6, I do not believe this homogenous descriptor to be uniformly applicable to the wide range of sites that nominally fall under this broad definition. However, I have used the term throughout this chapter wherever it was employed by the authors of the works discussed, so that the wide variety of sites to which it has been applied might become apparent. Due to the anecdotal nature of my use of the term “Kranzhügel”, it has been noted in inverted commas throughout.

2.1.2 Early Regional Studies

2.1.2.1. von Oppenheim

The first documented visits to ancient settlements in this geographical region were conducted by Baron Max Freiherr von Oppenheim, a German explorer and archaeologist, in the early 20th century. His notes and diaries from field visits, and across the GWJ in particular, have never been published systematically yet exist in fragmented form in various sources – including articles (von Oppenheim 1901, 1911), sections of volumes (von Oppenheim 1908, 1933), one full volume (von Oppenheim 1943), and most comprehensively Ursula Moortgat-Correns’ (1972) book on the regional context of the religious site of Ras al-Tell. In his travels of 1899, 1911-1913, 1927, and 1929, von Oppenheim visited a large number of sites and described many of them in detail, with special focus on the eight sites he deemed to be “Kranzhügel” (*ibidem*: 26-27). This term, which since has been used to describe various tells with an inner and an outer concentric wall (e.g. Casana & Herrmann 2010: 74; Lebeau 1990; Meyer 2010a, 2010c; Quenet & Sultan 2014; see Section 3.6), was defined by its originator von Oppenheim as referring to more or less circular or polygonal sites with large, yet low mounds. All of them, he emphasised, comprise an inner mound (which he called a “*Burg*” or “*Zitadelle*”) enclosed by bastions or an inner wall, and a lower-level terrace which encircles the former, itself enclosed by a second wall (Moortgat-Correns 1972: 26). He also states the discovery of large (more than 2 by 1.5 m) rough-hewn limestone blocks at these sites, and the existence at many of a wide depression, running in an east-west direction across the centre of the inner mound, which seems to line up with gaps in the outer wall representing possible city gates. Furthermore, von Oppenheim identified a key unifying factor in the settlement chronology of this site; they all appear to be constructed *ex nihilo* and permanently abandoned after a relatively short occupation (*ibidem*: 35).

Von Oppenheim observed and described pottery and small artefacts (including fragments of basalt vessels and tools, blades of flint and obsidian, spindle whorls, and terracotta objects) from the surfaces of these sites. Due to his previous experience with Jaziran pottery from his excavations at the type-site Tell Halaf, located in the northeastern corner of the Western Jazira (see Fig. 2.1), von Oppenheim was very surprised to find no

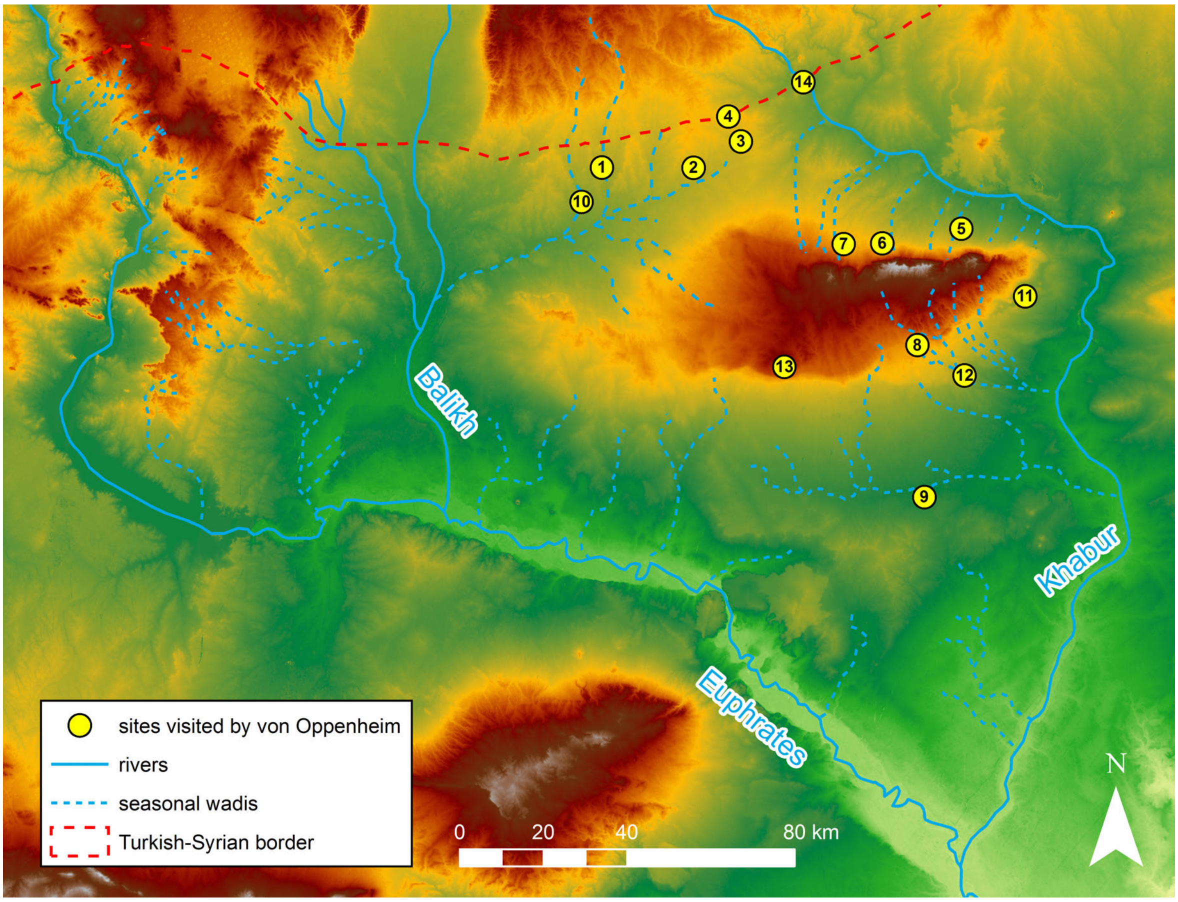


Figure 2.1: Map showing the distribution of the major sites in the GWJ visited and described by von Oppenheim.
1 - Tell Chuera, 2 - Tell Abu Shakhat, 3 - Tell Bogha, 4 - Tell Khanzir, 5 - Tell Mabtuh Sharqi, 6 - Tell al-Magher, 7 - Tell Mabtuh Gharbi, 8 - Tell Mu'azzar, 9 - Khirbet Malhat, 10 - Tell Dakhliz, 11 - Tell Makhrum, 12 - Tell Mityaha, 13 - Ras al-Tell, 14 - Tell Halaf.

instances of Halaf pottery (Moortgat-Correns 1972: 25-26). Instead, he described two predominant pottery styles, one yellowish-green to reddish-brown and the other greyish-black to red, which he divided into five vessel types (*ibidem*).

Of the sites visited by von Oppenheim, the eight he called "Kranzhügel" are Tells Chuera, Abu Shakhat, Khanzir, Mabtuh Gharbi, Mabtuh Sharqi, al-Magher, Mu'azzar, and "Malhat ad-Deru" (Moortgat-Correns 1972: 26-27), the true name of which has now been identified as Khirbet Malhat (Quenet & Sultan 2014: 118; Fig. 2.1). It is on these sites that his descriptions dwell in detail, regarding not only their physical form and composition, but also their distribution. Of particular note are von Oppenheim's descriptions of four of these sites as "*polygonisch*"; in other words not strictly circular. That this fact was noted by the earliest investigator of the "Kranzhügel" is remarkable, as many later interpretations, up to the present day, have persisted with the erroneous definition of them as being circular only (e.g. Lyonnet 2009: 180-182). As for their distribution, von Oppenheim believed the Khabur Valley (to the east) and the Wadi Hamar region (to the west) to be the limits of their occurrence, whilst considering Tell Dakhliz (40km east of the Balikh), while not a

"Kranzhügel" itself, to be the western boundary of the "Kranzhügel culture" (Moortgat-Correns 1972: 37; Fig. 2.1). Von Oppenheim also visited and extensively recorded the site of Ras al-Tell atop the hill of Jebelet al-Beidha, where the fragments of three large relief stelae and one originally 2.5 to 3-metre high statue were found. These depict bearded human male forms, and are carved from basalt, the nearest source of which lies some 60 km away at either the Menachir or el-Homma volcanoes (Fig. 1.6; *ibidem*: 10-20). Without parallel in the region, they were interpreted by von Oppenheim to have belonged to a religious site, possibly a location of pilgrimage, dating to a phase preceding the Hittite period (ca. pre-1600 BC; von Oppenheim 1933: 226-252).

As an early precursor to archaeological interpretations of the region, von Oppenheim's accounts were necessarily constrained by the state of knowledge at the time of writing. The lack of previous investigations in the region, and thus a lack of reference points for chronology, site type, and settlement patterns, means his descriptions are plagued by the same inaccuracies that affect all pioneering studies. With Tell Halaf being the only excavated site in the region at that time, von Oppenheim viewed all sites across the Western Jazira through the lens of that settlement's history, which itself had not been accurately interpreted at the time[17]. His assumption that Tell Halaf had exerted a cultural influence over this area during the 3rd millennium BC, a view based largely on his familiarity with that site, also skewed his interpretations of all sites he visited (Moortgat-Correns 1972: 26).

The great benefit of von Oppenheim's accounts, however, is that he accurately and comprehensively described what he saw "as is", while often fully acknowledging that his observations went against his assumptions about the region's past. This is clearly evidenced by the ease with which these descriptions can be matched up with the sites in question on aerial and satellite imagery, which of course show the landscape from a perspective to which von Oppenheim did not have access. Thus these early accounts, despite their strict focus on single large site observations (with no detailed descriptions of smaller sites in the intervening landscape) are an invaluable source of information.

2.1.2.2. Poidebard

Von Oppenheim's visits were followed in the 1920s by aerial surveys conducted by the French aviator and Jesuit missionary Antoine Poidebard. These, amongst the first attempts

[17] The "*Buntkeramik*" now associated with the Halaf culture was believed by von Oppenheim to date to a transitional 3rd-2nd millennium BC period, whereas already by the time of the publication of his preliminary site report in 1931, newer chronologies placed it some three millennia earlier (Orthmann 2002: 15-16).

at aerial archaeology in the world, provided a brand new perspective on the archaeological landscape. From 1925 to 1932, Poidebard carried out aerial reconnaissance from Bosra in the south of Syria to the Tigris River in the northeast, with the intent of mapping the Roman *limes* across the Syrian desert. As part of these investigations, he focused on the Khabur river basin ("*Haute-Djezireh*") from 1925 to 1927, and in so doing made some brief incursions into the Western Jazira also (Bauzou 2000: 59-64). Although tell sites were not his primary objective, Poidebard photographed (and subsequently sketched) several of these around the Jebel Abd al-Aziz range, including Tells Mityaha, Mu'azzar, and Mabtuh Sharqi, as well as Khirbet Malhat further south (though he did not know its name; see Fig. 1.5); and furthermore comprehensively published the data (Poidebard 1934).

The work undertaken by Poidebard in the Syrian Jazira was beneficial to modern investigations in several ways. Firstly, his photographs of tell sites provide the earliest confirmation of the accuracy of von Oppenheim's descriptions, lending greater credence to the latter's observations across the entire region. Secondly, the images themselves have intrinsic value for remote sensing coverage of this region, particularly as Poidebard's photographs are of higher resolution than the most readily available historic satellite imagery, CORONA. And thirdly, the pioneering integration of aerial photography and archaeology paved the way for further such work to be carried out up to the present day.

2.1.2.3. Mallowan

The visits to several sites in the Western Jazira by Max Mallowan, better known for his excavations of Tell Brak and sites along the Balikh River in 1937-1938, deserve a brief mention here. The published results of these visits, which took place in 1937, are very scant indeed, consisting of no more than a paragraph in Mallowan's (1946) article on excavations along the Balikh in 1938. Nevertheless, he described several sites since described as "Kranzhügel" as being "massive *talls* [*sic*] circular in plan and obviously enclosed by heavy circular walls or ramparts" (*ibidem*: 119). Mallowan noted his particular interest in Tells Bogha, Abu Shakhat, and Dakhliz (Fig. 1.5), making him the first archaeologist to visit these sites since von Oppenheim 38 years earlier. He also described the similarities of these sites to Tells Mu'azzar, Beydar and Bati (the latter two located in the Khabur Valley; Fig. 1.4), the form of which he knew from Poidebard's photographs. The sherds he collected from these sites, which he did not describe in detail, led him to date them to the MBA (2000-1500 BC) rather than the EBA, with the exception of Tell Abu Shakhat, where Mallowan found what he described as "burnished grey ware of the

Sargonid epoch [23rd-22nd century BC]"[18]. Mallowan (1946: 119) concluded with the "[hope] that these references may lead to further archaeological examination of one or more of these *talls*, which almost invariably lie in difficult and waterless country where labour is not easy to obtain". It would be another two decades until this hope was fulfilled.

2.1.2.4. van Liere and Lauffray

In the mid-1950s, soil scientist Willem van Liere and archaeologist Jean Lauffray made regional investigations in the Syrian Jazira, and in so doing gave birth to the ideas and concepts of landscape archaeology in a Middle Eastern context (Wilkinson *et al.* 2010: 748). Using aerial photographs that had originally been commissioned by the Syrian Ministry of Agriculture, and incorporating ground surveying techniques, they examined the region as a whole, forsaking large-site-by-large-site analyses for descriptions of small sites, off-site features and route ways emanating from and connecting settlements. This was a major departure from the aerial surveys of Poidebard, who, as van Liere and Lauffray (1955: 130) put it, "*utilisait une méthode d'observation directe et ne photographiait que des sites isolés: la vision d'ensemble du pays n'était pas fixée*"[19].

Van Liere and Lauffray's publication has in recent years been much referenced for its pioneering work in identifying so-called "hollow ways", which they termed "*routes rayonnantes*" (e.g. Ur 2003; Wilkinson 1993; Wilkinson & Tucker 1995: 24-28). These landscape features, which are found across most of the Jazira, are the archaeological footprints of heavily-used ancient routeways that emanated from large settlements, sometimes connecting them to other settlements, but often leading simply to surrounding pasture lands for livestock grazing (Wilkinson 1993: 560-561). In particular, the clear visibility of these route ways on satellite and aerial imagery, the latter of which was indicated by van Liere and Lauffray (1955: Figs. I, II, III) on their photographs, has been used to map, calculate, and compare their properties across wide regions of landscape (e.g. Smith 2008: 10-33; Ur 2003; Ur 2010a: 76-87, 129-146, Map 2; Wilkinson *et al.* 2010). However, the other major component of their article, a classification of fortified tell sites based on their visual form, has been largely ignored by subsequent investigations (Meyer 2010a: 15).

[18] This ware would later be equated by Kühne (1976: 40) with the North Mesopotamian "metallic ware", which he dated to the Southern Mesopotamian Early Dynastic II-III period (ca. 2750-2350 BC) – although Falb (2009: 89-92) notes that Kühne could not differentiate between the noncalcareous "true" metallic ware and the later, visually indistinguishable calcareous metallic ware; see Sections 2.1.3.1, 2.1.4.3.

[19] "[used a direct method of observation and only photographed individual sites: a holistic view of the landscape was not created]"

This classification is a sub-section of a 13-part typology that includes tells with rampart tiers, ordinary tells, camps, *castella*, and forts. Focus will here be given to the four "types" that relate to tiered fortified tells, which van Liere and Lauffray (1955: 133-134) divide as follows (see also Section 3.6):

Type I: Single elevated terrace (in the shape of a truncated cone) with exterior defences at, or close to, its base
Type II: Single elevated terrace with exterior defences (mostly consisting of a single or double ditch) some way from its base
Type III: Two concentric elevated terraces (the inner one higher than the outer) with two ramparts, one at the base of each
Type IV: Two concentric elevated terraces with exterior defences some way from the outer one's base

Each Type is subdivided into:
a) Defences which follow the shape of the overall plan of the tell (circular or regular polygon)
b) Defences which follow their own shape, irrespective of the tell (curved line or irregular polygon)

The vast majority of fortified tell sites van Liere and Lauffray located in the GWJ fall into Type IIIa (which equates with what are termed "Kranzhügel" by Meyer [2010a]), with Tells Chuera, Muazzar, and Khirbet Malhat being singled out as the clearest examples[20]. The tell sites in this region which differ from this supposed norm fall either into Type Ia or do not have "Kranzhügel"-type ramparts (van Liere & Lauffray 1955: 134). The authors further noted that at the centre of the inner terraces of Type IIIa sites, flat areas with branching undulations leading to stone gateways in the walls are often visible, indicating a central public space and planned radial road system (see Meyer 2010d). Stone, they stated, was sometimes also used for the construction of wall foundations and principal battlements. The apparent homogeneity of the visual forms of the majority of these tells led the authors to the conclusion that they were the result of the same construction techniques, designed to defend their shepherd populations from looting by nomads (van Liere & Lauffray 1955: 138 fn. 4, 139).

Tell Chuera, due to its large size and monumental edifices, was considered by the authors to have been the political centre of the GWJ, exerting control over the entire distribution region of Type IIIa tells, which, in contrast to von Oppenheim, van Liere & Lauffray (1955: 140) surmised to extend west of Tell Dakhliz and north of the Turkish border (see Fig. 1.5). Based on the well-fired grey and black ware pottery discovered at several sites in this region by Mallowan during his 1937 travels, van Liere and Lauffray

[20] Van Liere and Lauffray (1955: 139) also note that not all these sites are circular, some being "*en forme de pentagone ou d'hexagone*". Compare von Oppenheim cited in Moortgat-Correns (1972: 28, 30).

(1955: 139-140) proposed dating this system to the EBA "Sargonid" period, using the results of Mallowan's excavations at Tell Brak as proxy data. Furthermore, they believed their origins to lie in the "remodelling" of earlier "prehistoric" tells. This, the authors recognise, clashes with previous ideas of the Mitanni being their founders (e.g. Poidebard 1934: 149) which they consider to suffer from a lack of proof. Although they recognised the subsequent widespread abandonment of these sites, they placed this as late as the mid-2nd millennium (van Liere and Lauffray 1955: 140).

Van Liere and Lauffray's article also touches on the relationship between the archaeological and geographic landscape of the GWJ, especially with regard to precipitation, access to water[21], and agricultural quality of soils. They note that the majority of archaeological remains visible on aerial photographs lie between the 350/400mm and 200mm average modern annual precipitation isohyets to the north and south, respectively. Due to the scarcity of tells south of the present-day 200mm isohyet and the low elevation of those few that are located in that area, van Liere and Lauffray (1955: 135-136) concluded that the climate of the region had not changed much since the Neolithic period, save for a slight aridification. This conclusion was further supported, they stated, by a comparison between ancient settlements and modern soil qualities (from a map by the Syrian Agricultural Service), which showed a striking correlation between tell site locations and that of fertile alluvial basins. The density of settlements, the authors found, was in direct proportion to soil quality, and indeed in some areas, such as south of the Jebel Abd al-Aziz, each small area of good agricultural soil is characterized by a tell, whereas not a single tell exists in areas of poor productivity potential (*ibidem*).

Despite its fairly revolutionary concepts of landscape, site typology, and the importance of small and offsite features, van Liere and Lauffray's work exhibits similar limitations to other investigations of the time. The scarcity of ground surveys and the near complete lack of excavations are evident, leading many of the authors' conclusions to be not much more than surmises, which they freely admit on multiple occasions. The only archaeological evidence on the ground available to the authors came from six soundings Lauffray made at Tell Chuera in 1953. However the results of these were somewhat skewed by an objective to identify Chuera as the Mitanni capital Washukanni, and when it became clear that the evidence was going against this hypothesis, excavations quickly ceased (Moortgat 1959: 13). Nevertheless, although the authors' work occurred on the cusp of the commencement of detailed ground archaeology in the GWJ, it is only recently that

[21] This is something van Liere (1963) would expand upon in a later article, however focusing more on Syria as a whole with little specifically on the (Greater) Western Jazira.

the full extent of their landscape analyses is being brought to bear on what has been discovered in the intervening half century.

2.1.3. Excavations

The excavations listed below comprise only those at sites in the steppe (away from river valleys) that saw occupation during the late 5th to 3rd millennia BC. Further excavations that are located within the geographical boundary of the GWJ but do not meet these criteria include Tells al-Sweyhat, Hammam al-Turkman, and Ziyadeh (located on rivers); Arslan Tash (no late 5th-3rd millennium material); and Tell Halaf (located on a river and containing no late 5th-3rd millennium material; Fig. 2.2).

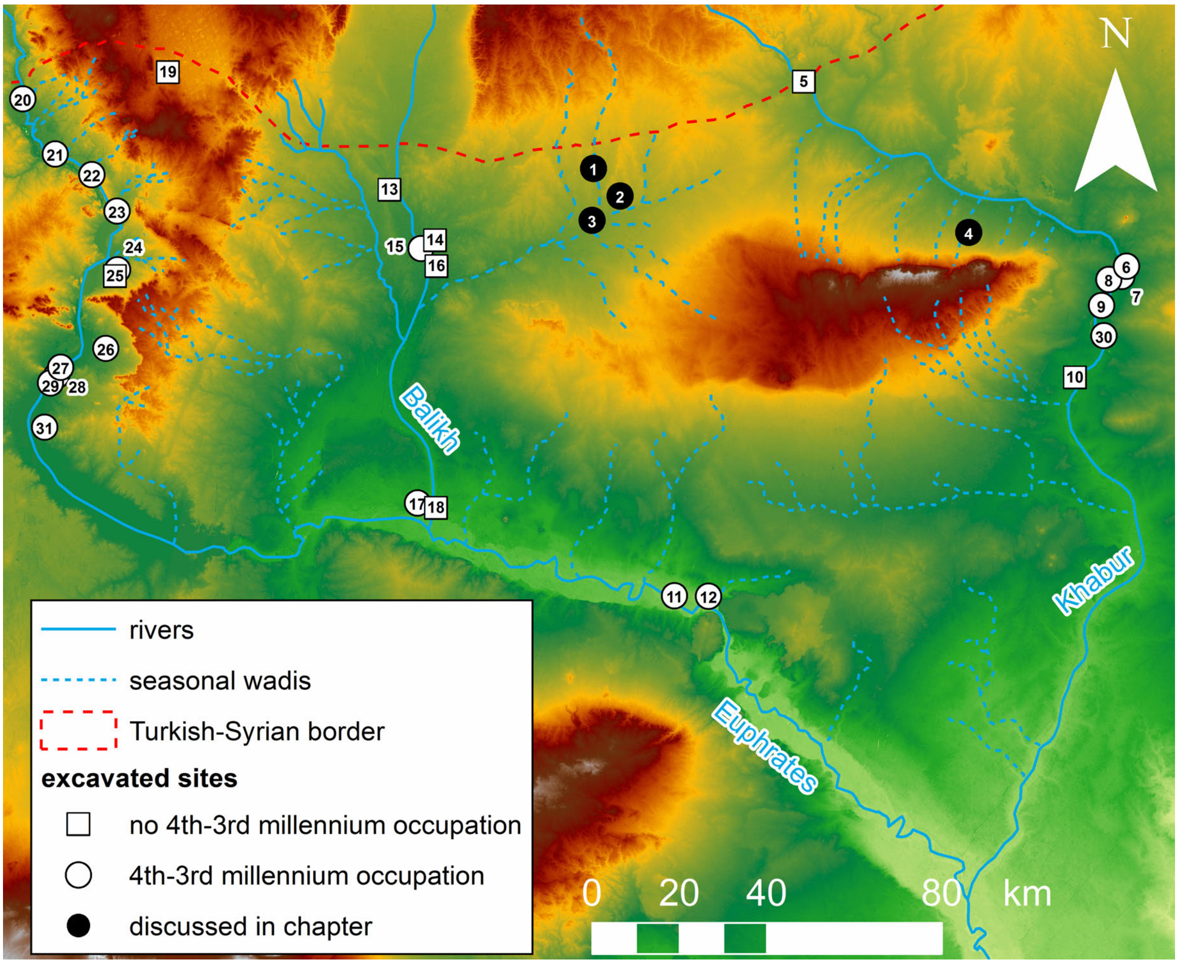


Figure 2.2: Map showing all excavated sites in the GWJ.
1 - Tell Chuera, 2 - Tell Kharab Sayyar, 3 - Tell Tawila, 4 - Tell Mabtuh Sharqi, 5 - Tell Halaf, 6 - Tell Judayda, 7 - Tell Ziyade, 8 - Tell Melebiya, 9 - Tell Knedig, 10 - Tell Ajaja, 11 - Tell Humeida, 12 - Tell Qabr Abu al-Atiq, 13 - Tell Damashliye, 14 - Tell Sabi Abyad, 15 - Tell Hammam al-Turkman, 16 - Khirbet Shenef, 17 - Tell Bi'a, 18 - Tell Zeidan, 19 - Arslan Tash, 20 - Tell Shiukh Fuqani, 21 - Tell Ahmar, 22 - Qara Qozaq, 23 - Tell Kosak Shamali, 24 - Tell Banat, 25 - Tell Bazi, 26 - Tell al-Sweyhat, 27 - Tell al-'Abd, 28 - Tell Munbaqa, 29 - Tell Sheikh Hassan, 30 - Tell Mashnaqa, 31 - Tell Halawa.

2.1.3.1. Tell Chuera

Tell Chuera, located in the northwest of the Western Jazira, is a large fortified circular settlement dating largely to the 3rd millennium BC. It has been used as the type-site for “Kranzhügel” settlements due to its prominence in archaeological discourse, a result of its unique (for this region) half-century of continuous archaeological investigation. It is situated along the north-south running Wadi Chuera (a branch of the Wadi Hamar), about 6km south of the Syrian-Turkish border and equidistant from the Balikh to the west and the northern Khabur valley to the east (Fig. 2.2). One of the largest settlements in the region, with an average diameter of 912 m and an area of 68 ha, it was first documented by von Oppenheim after his 1913 visit. Following this, Poidebard, C.-L. Brossé, and Mallowan investigated the site in the 1920s and 30s, and Lauffray excavated some test trenches in the mid-1950s, but it was with the start of full-scale excavations in 1958 under Anton Moortgat that more accurate interpretations could begin to be made. Much of the data discussed below should be viewed in tandem with that from the surrounding Wadi Hamar Survey (Section 2.1.4.7).

History of interpretations of occupation periods

Although these excavations commenced with the assumption that Tell Chuera was a Hurrian settlement of the Akkadian period (2350-2200 BC; Moortgat 1959: 23), what they brought to light soon redefined archaeological understanding of sites in the GWJ. Moortgat’s initial interpretation of the chronology of Tell Chuera, based on comparisons of metallic ware pottery with equivalents dated by Mallowan (“grey ware”; 1947: 22-31) at Tell Brak, changed with the discovery of several so-called “*Beterstatuetten*” in 1963 and 1964 (Moortgat 1965: 23-37). These small praying figurines, discovered in the “kleiner Antentempel” (now called Bereich K), bear an extremely close similarity to ones discovered in Southern Mesopotamia which had been stratigraphically dated to the Early Dynastic II period (ca. 2650-2500 BC); what Moortgat called the “*Mesilimzeit*”. Moortgat (1965: 37) immediately recognised the value of such a chronological fixed point, emphasising its implications not only for Tell Chuera itself, but for the entire region of Northern Mesopotamia “*vom Euphrat bis zum Djardjar* [Jaghjagh]”. These finds led the excavators of Tell Chuera to date the entire settlement period of the site to the ED II (Meyer 2010a: 16). However, this date was to be pushed back further in the early 1980s with the discovery of cylinder seals, again from Bereich K, that could be dated to the ED I (ca. 2900-2700 BC) based on their stylistic appearances (Moortgat-Correns 1988: 15-24).

Continued excavations in the late 1980s, under the direction of Winfried Orthmann, first attempted a relative chronology of the individual excavated areas. This led to a division of the settlement chronology of Tell Chuera into two main distinct periods: TCH I, the EBA habitation across the entire site (late 4th/3rd millennium); and TCH II, a much smaller habitation from the Late Bronze Age Mitanni and Middle Assyrian periods (mid-late 2nd millennium). Furthermore, the earlier of these periods was divided into five, then six sub-categories[22] based on changes in ceramic typology identified by Orthmann (1995: 15), but not fully documented and specified until recently (Hempelmann 2013: 15). This chronology has since been refined by Hempelmann (2013: 157-161; Tab. 2.1), who also introduced calibrated radiocarbon dates and reconstructions to allow for absolute dating (Tab. 2.7; see Section 2.3.4.2). This led to the realisation that the foundation of Tell Chuera (around 3100 BC) occurred earlier even than that of Mari, long considered to be the first fortified "circular city" in Northern Mesopotamia (Butterlin 2013: 259).

Another key factor in the determination of the absolute settlement chronology of Tell Chuera was the dating of North Mesopotamian metallic ware, found in abundance at the site. With the discovery of this pottery type in the same stratigraphic context as the aforementioned "*Beterstatuetten*", Moortgat dated it to the Mesopotamian Early Dynastic period. This interpretation was later supported by Hartmut Kühne (1976: 66-67) in his analysis of Tell Chuera ceramics, a conclusion which was heavily criticised in the following decade, as evidence from other northern Mesopotamian sites dated the ware to the Akkadian period (ca. 2400-2100 BC; Falb 2009: 89). However, analyses on the chemical and physical makeup of metallic ware in the late 1980s showed there to be two types of metallic ware, indistinguishable to the naked eye. These comprise of a variety with a low calcium content, stratigraphically dated at Tell Chuera to ca. EJ II-EJ IIIb (2750-2300 BC), and one with a high calcium content dated to the later EJ IIIb-ca. EJ V periods (2400-1900 BC) – a distinction applicable on a regional basis (Pruß 2000: 194-197). Thus, while both Kühne and his critics had been correct in their interpretations, the fact that it was the former variant that was found at Tell Chuera again supported dating the foundation of the site to the early EBA (Falb 2009: 90-92).

[22] These being TCH IA-IE, of which TCH IB was subsequently subdivided into IB alt ("old") and IB jung ("young"). An additional period, TCH IA/IB (located between IA and IB alt) has since been introduced by Hempelmann (2013: 157-161; see Section 2.3.4.2).

Approximate Dates BC	Chronological Phase	Major Events
3100-2850	TCH IA	- initial EBA occupation of upper mound - construction of initial (later inner) wall - construction of "Steinbau 6" temple - "Anton-Moortgat-Platz" laid out
2850-2700	TCH IA/IB	- period of crisis - switch from gazelle to sheep economy
2700-2625	TCH IB alt	- end of crisis - reorganisation of settlement structure
2625-2560	TCH IB jung	- initial occupation of lower town
2560-2465	TCH IC	- full occupation of lower town - construction of outer wall - inner wall falls into disrepair
2465-2275	TCH ID	- destructive violence at outset - construction of "Palast F" - "Steinbau 4" becomes a temple in antis
2275-2125	TCH IE	- lower town abandoned - eventual abandonment of entire site

Table 2.1: TCH I chronology table with significant events in the settlement's development indicated.

Although chiefly recognised as a key settlement of the 3rd millennium BC, human occupation of Tell Chuera began more than two millennia earlier, during the Halaf period. Although evidence for this is slight, it is definite, as excavations from 1997 in Bereich K showed, which unearthed several intrusive sherds of Halaf pottery (Dohmann-Pfälzner & Pfälzner 2002: 12-13). The same excavation also brought to light remains of habitational architecture quite different to that found anywhere else at the site, which were dated to the LC, specifically the mid-4th millennium BC, due to the discovery of ceramics of the "coba bowl" form that bear significant similarities to that of Period V A at Tell Hammam et-Turkman. Further excavations have uncovered early LC material across much of Tell Chuera's upper town, suggesting a settlement of considerable size (Helms & Tamm 2014: 287-288). Stratigraphically above these remains, the excavators encountered a temporal gap of at least several centuries (ca. from 3500 to 3100 BC) of abandonment before the emergence of EBA material, indicating that this period saw intermittent rather than continuous human occupation (Dohmann-Pfälzner & Pfälzner 2002: 12-14; Hempelmann 2013: 271).

A key factor of the history of this EBA resettlement is the somewhat contradictory way in which there is clear evidence for urban planning from the outset, yet at the same time major instances of organic growth. Although the tell was reoccupied and its inner wall constructed at the outset of the TCH IA period, it did not attain its maximum size until TCH IB jung at the earliest; the initial phase consisted of the later upper town alone (see Fig. 2.3; Tab. 2.1). Tell Chuera was thus a "normal" tell before its ca. 2600 BC expansion, with a small-sized radial road system and dense habitation (other than the large public areas – see below), and evidence of public and private buildings existing side-by-side. Indeed, this organisation remained constant after the expansion, with large habitation districts either side of the central axis; thus the upper town was never an "acropolis" for elites[23] (Meyer 2010b: 199). However, this initial tell was fortified with a wall (the later "inner wall") from the earliest phase, complete with city gates corresponding to radial routes inside the settlement (Meyer 2010c: 173). The earliest phase of the "outer wall" dates to late TCH IB jung/early TCH IC, closely following at least partial occupation of the lower town area (Hempelmann 2013: 275). This part of the city had less dense settlement than the upper town, and included three distinct areas – for storage, animal pens and production workshops (Meyer 2010b: 200-201).

Regarding the relative chronologies of the "inner" and "outer" walls, excavations in Bereich H (Falb 2010: 95-97) and D have shown that the former was abandoned as a fortification contemporaneously with the construction of the "outer" wall and expansion into the lower town. Not only is the structural decline of the former wall whilst the settlement was still occupied evident, but also the construction of houses post-TCH IB jung directly abutting it (Meyer 2010d: 204). This strongly indicates that the "inner" and "outer" walls were never used for defence simultaneously, thus, despite the apparent nature of Tell Chuera's form, the site was never truly a double-walled city (Meyer 2007: 137; Meyer & Orthmann 2013: 154). The importance of this can hardly be overstated, as it impacts on interpretations of "Kranzhügel" across the entire GWJ; as Meyer (2010c: 181) states, "*baugeschichtlich und auch funktional muss dieser Bauweise [...] eine neue Bedeutung beigemessen werden*"[24].

Early urban planning at Tell Chuera is evidenced by the initial mound's main public features: a central square (dubbed the "Anton-Moortgat-Platz") and main axis, the latter of which is comprised of a 4-metre wide street and runs through the later lower town, indicating a certain amount of adherence to the initial town plan during its expansion (Hempelmann 2013: 16; Fig. 2.3). Indeed, these two features remained for the entirety of the site's EBA occupation (Meyer 2010d: 204). These mostly date to TCH IA/IB, when,

[23] As it was e.g. at Tell al-Sweyhat and Titriş Höyük (see Wilkinson *et al.* 2012: 175-176).
[24] "[from the point of view of structural chronology and also function, this structural pattern must be attributed a new meaning]"

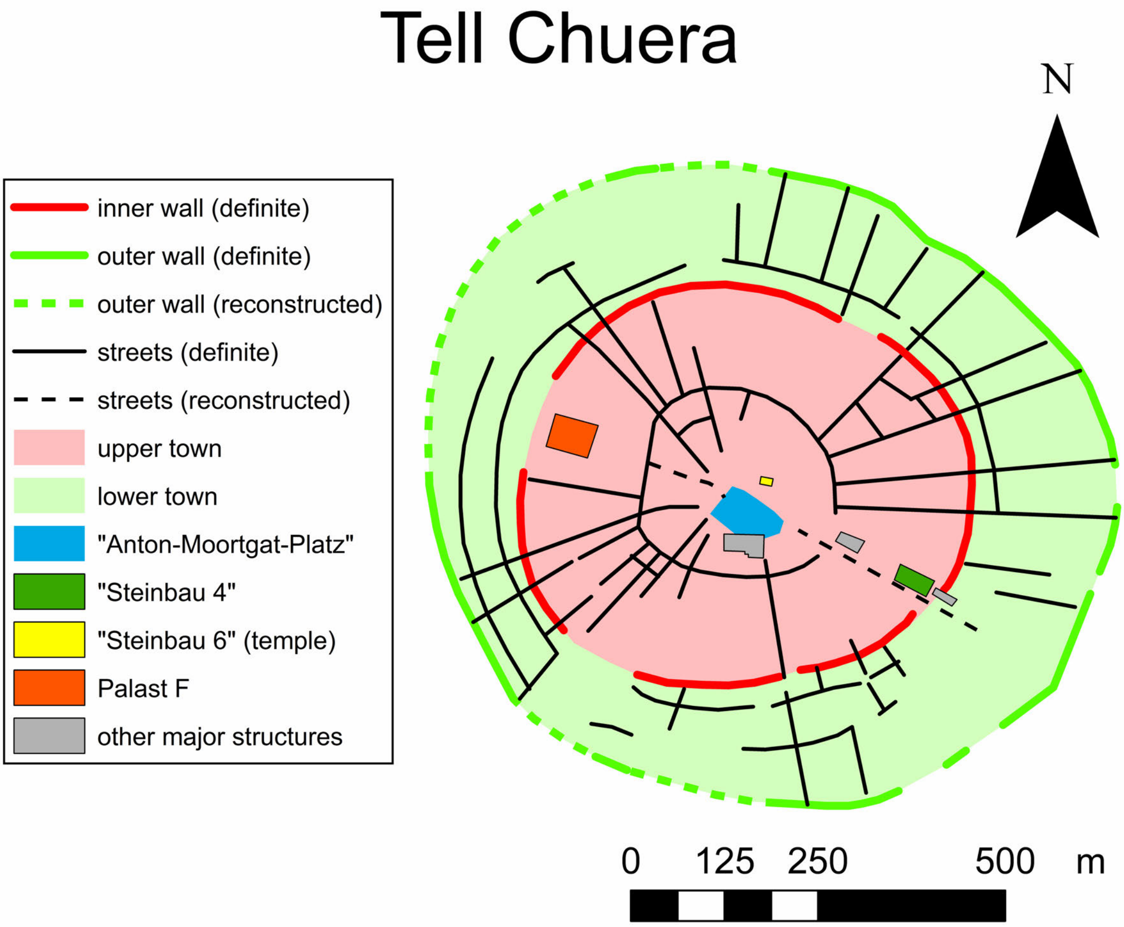


Figure 2.3: Line drawing of the main structures and thoroughfares within Tell Chuera, showing its radial street system, two phases of city wall, and major features; based on excavation data (Meyer 2010b: Taf. 15) and the magnetometry survey (Helms & Tamm 2014: Fig. 2).

after a period of crisis, Tell Chuera's settlement structure was reorganised (Hempelmann 2013: 274; see Tab. 2.1). At least four wells date from this period, three located in the adjacent Wadi Chuera (one of which was confirmed by excavation to be stone-clad and have a depth of 3 metres), and one in the later lower town area (Bereich P), likely abandoned once it became occupied (Tamm 2010: 585)[25]. The main period of construction for public buildings occurred after Chuera's expansion into its lower town, during TCH IC (Hempelmann 2013: 275). It is to this period that the earliest incarnations of the stone-constructed, often monumental "Steinbauten" of Moortgat's excavations date. From "Steinbau 4" (since thoroughly excavated), it can be deduced that these monumental structures remained in use until TCH IE, each comprising several construction phases. An initial temple ("Steinbau 6") was also constructed during TCH IC, which similarly underwent many changes during several building phases (Meyer 2010d: 205).

[25] Two further wells were discovered within Tell Chuera (in Bereiche A, H Ost; the latter clad by tiles), as well as one cistern (in Bereich L). However, no dating evidence exists from these (Tamm 2010: 582).

The next structural phase, TCH ID, retains many general similarities with the preceding one, with the "Anton-Moortgat-Platz", the radial road system, and "Steinbau 4" remaining. However, its outset was marked by some sort of destructive violence, evidenced primarily by the discovery of numerous unburied individuals (several with weaponry) in a stratigraphic layer marked by ash deposits (Hempelmann 2013: 275). This event did not bypass the city's structures either, with "Steinbau 4" undergoing a transformation towards a definite temple *in antis*, that is, the two opposite walls enclosing its longest sides continue beyond a central hall to create a vestibule[26] (Castel 2010: 123). Public buildings seem to have been confined to the unchanging central axis during this phase, the rest of the upper town being taken up by private dwelling quarters (Meyer 2010d: 206). Meanwhile the outer wall underwent a particularly significant transformation, as the destructive event seems to have created the need to reconstruct it, though the nature and extent of this is not clear. What is evident, however, is that the reconstructed outer wall was larger than the previous one, with a glacis and numerous bastions at regular intervals. It is also by the late TCH ID that the outer wall took on a definite polygonal shape, though this could also have occurred slightly earlier (Meyer 2010c: 176).

The end of Tell Chuera's EBA occupation, in TCH IE (ca. 2250-2100 BC), is the least well documented period of the site. What can be said is that although the site declined fairly suddenly (and more or less simultaneously with other sites in the region; see Sections 2.1.4.4-7), the lower town was abandoned some time before the final vacation of the upper town, indicating a somewhat more gradual decline than once thought (Helms & Tamm 2014: 289; Pruß 2013: 139; Tamm 2014: 117-118). This evidence goes hand-in-hand with the lack of significant archaeological layers of destruction during this phase, which likely indicates a non-violent end to occupation (Meyer 2009: 56). As for the Late Bronze Age TCH IIA (Mitanni) and TCH IIB (Middle Assyrian) periods, they too have been little investigated. So far, apart from a few settlement remains in the northern part of the site, only one large building from TCH IIB, dated to around 1100 BC has been excavated. This structure has been interpreted as a palace corresponding to the political structure of the Assyrian Empire, which comprised several administrative centres of varying size and importance (Bösze 2007 cited in Meyer 2009: 58). This palace also contained 112 clay tablets containing administrative texts, which identify Middle Assyrian Tell Chuera with the trading-post town of Harbe, also mentioned in texts from Alalakh and Tell Sheikh Hamad (Jakob 2009).

[26] This form of temple is present at several other 3rd millennium sites in northern Syria (see Castel 2010).

Political and economic implications

Tell Chuera appears to have undergone a social and economic reorganisation contemporaneous with its structural one at the end of TCH IA/IB. Prior to this, evidence from the initial tell of TCH IA of newly constructed dwellings not aligned with the pre-set street plan and building sizes indicate a certain amount of semi-independence of local neighbourhoods. This is especially visible in excavations in Bereich K, where the social group owning private houses clearly constructed them in accordance with their own needs, rather than aligned to the desires of a central authority (Hempelmann 2010a: 244-245; 2010b). This albeit limited measure of societal independence, however, reduces significantly after the TCH IA/IB crisis. Already in TCH IC, the separation of formerly communal public areas from their surroundings (evidenced by enclosing walls in Bereich S) indicates a stronger social differentiation, as does the construction of monumental buildings for central institutions – an emergence of elites contemporaneous with that elsewhere in northern Syria (Hempelmann 2010a: 246; 2013: 275; Ur 2010b: 404-412; Tab. 2.3). Concurrently, a significant change in the faunal record can be observed. While during TCH IA and IA/IB moderate numbers of sheep and goat remains are almost matched by gazelle remains, the latter diminish by three quarters in TCH IC (Vila 2010; Tab. 2.2). At the same time, percentages of sheep and goat individuals double, and remain high until Tell Chuera's late EBA abandonment.

Approximate Dates BC	TCH Period	Bereich	% gazelle individuals	% sheep & goat individuals
3100-2850	IA	K	18.6	26.2
2850-2700	IA/B	K	20.9	36.5
2700-2625	IB alt	K	6.2	68
2625-2560	IB jung	K	4.8	74.6
2560-2465	IC	K	8.2	72.6
2465-2275	ID	H	4.7	55.3
2275-2125	IE	H	4.8	61.8

Table 2.2: Percentages of gazelle and sheep/goat individuals of the total assemblage at Tell Chuera over time (collated from Vila 2010: Tableaux 1 & 2).

In TCH ID, following the destructive event described above, the emergence of just five distinct types of "*Parzellenhäuser*" – largely carbon-copy dwellings based on a single plan – as the sole form of private houses emphasizes the role of an organising power (which would likely have centrally controlled and allotted these) to an even greater extent (Pfälzner 2001: 348, 378-379). A more visible sign of centralised power exists in the form of the first evidence of a central ruling institution; Palast F. Based on this palace's simultaneous emergence and structural similarities with that of Ebla and Tell Bi'a (Tab.

2.3; see Fig. 1.4), the presence of a local ruler is surmised by Hempelmann (2013: 275-276). This, combined with textual evidence from Ebla and Tell Beydar[27], is evidence for such organisation emerging due to the pressures of increasing economic and military competition with neighbouring polities (Hempelmann 2010a: 248). It has been suggested by Alfonso Archi (1989) that during TCH IC and ID Tell Chuera may have been synonymous with the city of Abarsal, mentioned in the Ebla texts as a large regional power in northeast Syria on a par with Mari and Nagar (Tell Brak). This identification has been only very tentatively discussed by the excavators of Chuera (see Meyer 2010a: 24-28), and there are many doubts as to its veracity. Thus while this remains a fascinating possibility, descriptions of Abarsal gleaned from texts cannot be used as definite sources of information for the site.

Approx. dates BC	TCH phases	Kharab Sayyar levels	Hammam al-Turkman phases	Tell Bi'a structures	Tell Leilan phases	Mari levels	Ebla phases
3100-2850	TCH IA	16-24	VB				
2850-2700	TCH IA/IB	[hiatus]			IIIa IIIb	14-18 (?)	
2700-2625	TCH IB alt	12-15				10-13 (Ville I)	IIA
2625-2560	TCH IB jung	10-11		"älteste Reste"	IIIc IIId		
2560-2465	TCH IC	6-9	VI east	Grabbauten	IIa	[hiatus]	[hiatus]
2465-2275	TCH ID	4-5		Palast B		6-9 (Ville II) 1-5	IIB1 IIB2
2275-2125	TCH IE	1-3	VI west	Pfeilergebäude Phase 4-2		Ville III	

Table 2.3: Table showing the chronological relationship between periods at Tell Chuera and other major sites across Northern Mesopotamia; adapted from Meyer (2010a: 27).

2.1.3.2. Tell Kharab Sayyar

Located roughly 8km southeast of Tell Chuera, Kharab Sayyar (Fig. 2.2) is a multi-period site that comprises two main occupation phases: a circular, conical tell (ca. 3ha) dating to the 3rd millennium BC and a nearly perfectly square, fortified Early Islamic settlement (690 by 680m; ca. 47ha) dating to the 8th-11th centuries AD. The latter of these settlements was constructed around the earlier tell, so that it was entirely encompassed within the walls of the Islamic town. Furthermore, the top of the tell was flattened to allow for the construction of a citadel on its summit. However, the extent of the damage incurred by the 3rd millennium remains as a result was slight, and excavations by a joint Syrian-German team of the Department of Antiquities, Raqqa, and the Goethe-Universität

[27] These indicate that at the time of TCH ID, northern Mesopotamia was divided up into several regional political states, at least four of which were in constant military and economic conflict with smaller polities; see Meyer (1996: 155-159).

Frankfurt from 1997 to 2004 have provided an invaluable view of a small tell in the Western Jazira, which can be nicely compared and contrasted with nearby Tell Chuera.

The excavations on the tell consisted of a step-trench on its slope and a few trenches on its horizontal summit. The latter revealed adjacent private houses, storage spaces, and a house comprising a single room that possibly had a sacred use (Meyer *et al.* 2001: 211-213). It is the step-trench, however, that provided the most detailed evidence for the site's settlement history. Apart from some Halaf pottery sherds from secondary deposits, the oldest remains were dated to the beginning of TCH IA (Meyer *et al.* 2003: 88-90, 2005: 18-20; Tab. 2.3). Most structural deposits here consisted of private houses similar to those of Bereich K at Tell Chuera, with hearths, ovens, and stone-clad and topped water channels. Although 19 phases of construction were identified for these, most consisted of mere modifications to their existing layouts, with only two definite breaks in the architectural development. The earlier of these breaks, at the start of TCH IA/IB, is the most definite, constituting an abandonment of settlement until TCH IB some 150 years later (Hempelmann 2013: 273-274; Tab. 2.3). Most noticeably, this second resettlement of the tell saw the construction of a new city wall (see below). A reorganisation of living quarters followed, with the construction of new houses not aligned to previous layouts, although a consistent orientation was maintained. The second break in the site's architecture did not occur until the end of TCH IC, around the same time as the destructive event at Tell Chuera (see above; Meyer *et al.* 2005: 20).

Fortifications and internal structures

The step-trench excavations at Tell Kharab Sayyar discovered an enclosing wall comprised of two distinct phases of construction. The initial mud-brick wall, while at first merely recognised as a "*Massiv aus Lehmziegeln und Lehmziegelbruch*"[28] (Meyer *et al*. 2003: 86), was shown by the results of a 2003 test trench to be constructed on virgin soil, and was dated to TCH IA (Meyer *et al.* 2005: 16-18). From the same period, a number of rooms that lay beyond the wall were excavated. These have thicker walls than those of the houses within the settlement, and no visible gaps for doors, indicating an upper level entry and leading the excavators to surmise them to be for storage purposes (*ibidem*). Additionally, clearly-defined segments of the site, separated by internal walls, were identified; interpreted as "town quarters", each housing a different kinship group responsible for their own district's section of the town wall (Hempelmann 2013: 272).

[28] "[a solid construction of mud-bricks and broken mud-brick]"

However, the discovery of graves with goods dated to early TCH IA/IB located within the wall itself indicates that it fell out of use relatively rapidly; although the wall was not destroyed, its purpose as a defensive structure was soon abandoned, as indeed was the entire site (Meyer 2000: 301)[29].

The second phase of the wall, which completely replaced the earlier structure, was constructed at the start of TCH IB alt, contemporaneous with the site's resettlement. This was a full metre thicker than the previous wall, and featured a two metre wide ditch running along the inside course of the wall, possibly for greater defensive value (Meyer *et al*. 2003: 86). This period also saw Tell Kharab Sayyar's first significant change in ceramic typology: the disappearance of *cyma-recta* bowls from the archaeological record and the appearance of previously absent metallic ware (Meyer *et al*. 2005: 19-20).

In relation to the close region, a clear comparison can be made between the development of the fortifications at Tell Kharab Sayyar and those at Tell Chuera, only 8 km away, especially as the pottery typologies match up such an extent as to allow the use of a single local chronology (TCH). As mentioned, the initial wall at the former site was constructed on virgin soil, thus it existed from the late 4th millennium re-occupation of the site during TCH IA. This is directly comparable with the initiation of settlement and fortifications at Tell Chuera, both in terms of relative (the construction of a wall concurrent with the initial occupation) and absolute (occupation and fortifications dating to TCH IA) chronology (see Tab. 2.3).

This temporal similarity does not, however, apply to the second phase of the wall at Tell Kharab Sayyar. To start with, the clearest difference is the structural variation between an outer wall encompassing a lower town at Tell Chuera, and a new wall directly overlying an earlier one at Tell Kharab Sayyar. This obvious distinction between two very different site types aside (Tell Kharab Sayyar featuring no spatial expansion of settlement), the second wall at the former site was constructed during TCH IC, around half a century after its counterpart at the latter. This leads to the possible hypothesis that the concept of constructing a second wall pioneered at Tell Kharab Sayyar became a prototype for later implementation at Tell Chuera, where the idea was adapted to accommodate that site's much greater and faster-growing population.

[29] A similar phenomenon of an enclosing wall being rapidly used for graves exists at Tell Beydar (see Bretschneider 1997).

2.1.3.3. Tell Tawila

A third site in the Tell Chuera region excavated by the Goethe-Universität Frankfurt in conjunction with the Department of Antiquities, Raqqa, Tell Tawila is a slightly oval tell site, roughly 5ha in size, located 12km south of Tell Chuera (Fig. 2.2). The focus of its 2005-2006 excavations was the site's Halaf and Ubaid occupations, being one of only three settlements in the Wadi Hamar Survey region (discussed in detail in Section 2.1.4.7) larger than 1ha containing any material from those periods (Becker 2004: 111-112). In addition to the excavations, an initial magnetometer survey was carried out in 2003, which most notably revealed a series of ditches, with three separate ditch systems visible (Becker *et al.* 2007: 217-219). On the basis of these results, four trenches were excavated over the course of two seasons.

The predominant excavated remains were from the Halaf, which the excavators had expected due to the roughly 1000 pottery sherds dating to that period collected from the tell's surface. Most strikingly amongst these remains, several circular structures were uncovered, each between 5 and 6 metres in diameter, with walls around 30cm thick (Becker *et al.* 2007: 220-221). These buildings, the interiors of which often contained ovens, provided evidence for several architectural phases, indicating a lack of occupational continuity even during the earliest phases of Tell Tawila, especially during the very late Halaf (*ibidem*: 222-233). However, perhaps the most important find from the Halaf period was the discovery, in Bereich C, of an internal canal, constructed at the very outset of settlement at the site. This feature, the first evidence for a Halaf-era canal, seemed to have been in use only initially, gradually losing its purpose over the course of the period (*ibidem*: 234-236).

Though the Halaf period dominated the structural remains excavated at Tell Tawila, the LC was also represented in the excavations. This was in the form of rectangular structures, with walls 15-35 cm thick, which were found in Bereich A and B (Becker *et al.* 2007: 220-233). Further evidence for LC occupation was provided by the discovery in Bereiche B and D of coba bowls, typical ceramics of this period, associated with the LC 1 sub-division (see Section 2.3.3.1; Rothman 2002: 55; Becker *et al.* 2007: 235). Other periods of occupation, including Ubaid, EBA, Iron Age, and early Islamic, were evidenced only by scattered pottery remains.

Settlement chronology

The earliest evidence for habitation at Tell Tawila is the early Halaf (Halaf I), dated by the excavation team to around 5900 BC, an occupation which lasted until the late Halaf/early Ubaid. This is comparative with another Halaf-period site in the region, ‘Ajila south (14km ENE of Tell Tawila; see Fig. 1.5), which underwent a magnetometer survey as part of the same investigation into the Halaf period in the region. At this site, circular structures very similar to those at Tawila were visible on the survey results, while pottery sherds collected from the surface dated it to 5800-5300 BC, or Halaf IIa/b (Becker 2004: 120-121). Both Tell Tawila and ‘Ajila south were abandoned at the end of the Halaf period, but at Tawila at least, resettlement occurred during the Ubaid, albeit of a much smaller size (*ibidem*; Becker *et al.* 2007: 258-263).

Thus the hypothetical regional settlement pattern which the excavation team extrapolated from its investigations into the pre-4th millennium habitation of the region surrounding Tell Chuera is as follows: A number of small settlements were established at the start of the 6th millennium BC – 12 sites under 1ha in size showed evidence of Halaf occupation in the Wadi Hamar survey region (Becker 2004: 111) – with some larger centres also existing (such as Tell Tawila, ‘Ajila south, and Tell Chuera). These settlements were subsequently probably all abandoned at the end of the Halaf period (late 6th millennium), or at the latest during the very early Ubaid. Then, re-occupation occurred at some point during the Ubaid period proper, with settlements often occupying the locations of previous Halaf sites, but being of much smaller size (Becker *et al.* 2007: 258-263). This proposal of a dynamic 6th-5th-millennium settlement pattern would seem to reflect what is known of the equally erratic occupational history of the subsequent millennia. Becker *et al.* (2007: 263) suggest the reasons for such settlement shifts to be multicausal, based on a combination of environmental and cultural-historical reasons, although they do not elaborate on this point. Thus this proposition provides an important backstory to the settlement periods investigated in this thesis.

2.1.3.4. Tell Mabtuh Sharqi

One further site has been excavated in the GWJ, although the dearth of information on it makes incorporating its results into such a regional study practically impossible. Located about 4km north of the Jebel Abd al-Aziz mountain range, in the east of the Western Jazira, Tell Mabtuh Sharqi (Fig. 2.2) is a clear example of the “Kranzhügel” type of settlement; surrounding its circular upper town of roughly 9ha a very clear concentric lower town completes the settlement’s total area of more than 40ha (Gernez 2012). A series of excavation seasons took place at this site between 2001 and 2010 under the direction of Dr. Antoine Suleiman of Damascus University, unearthing large portions of the upper town, and some of the lower town[30] (Gernez & Souleiman 2013). These uncovered, amongst other remains, large stone structures, domestic architecture, and parts of a city wall[31] (Falb 2009: 271). With the death of Dr. Suleiman in 2012, very few excavation results have since been published, and what information is available is fairly limited.

A little can be said about the settlement’s occupation chronology, however. The earliest remains date from the early 3rd millennium BC, evidenced by the discovery of Ninevite 5 pottery in the upper town, indicating that at least this part of the site was inhabited by EJZ 2 (ca. 2750-2550 BC; Gernez 2012; Gernez & Souleiman 2013). The excavators also surmise occupation during EJZ 3 (ca. 2550-2350 BC), as although no specific ceramic finds date to this phase a continuous occupation sequence is visible until EJZ 5 (ca. 2100-2000 BC). It is from EJZ 4a onwards that the main phase of occupation occurred, with a temple structure (“Temple N”[32]) dated to late EJZ 3/EJZ 4a (ca. 2350 BC; *ibidem*). These dates coincide with the pottery analysis carried out by Christian Falb (2009: 348, 392), who dated fragments of the “Metallic Ware” and “Combed Wash Ware” types to the EBA. Correlating with settlement patterns elsewhere in the Western Jazira, Tell Mabtuh Sharqi too seems to have been abandoned by the end of the 3rd millennium, with no evidence for occupation later than EJZ 5 (ca. 2100-2000 BC; Gernez & Souleiman 2013).

2.1.4. Surveys and Site Visits

Although site visits loosely akin to surveys were the first type of archaeological investigations to take place in the GWJ, true surveys in the modern sense did not happen until the mid-1970s. When these first penetrated this region, they did so as side-goals to gather proxy data providing broader contexts to their main areas of interest, the river valleys of the Khabur and Balikh. Only in the 1990s did archaeological surveys specifically target the GWJ. What follows is a chronological list of all visits and surveys that, at least in part, concerned themselves with the GWJ, although not all did so in the capacity of detailed research.

[30] The extent of Suleiman’s excavations is best assessed by their distribution on GeoEye imagery from GoogleEarth, taken in October 2010 (DigitalGlobe 2013).
[31] Presumably the inner wall, as deduced from satellite imagery; see previous footnote.
[32] This temple is one of two discovered at Tell Mabtuh Sharqi. As with the rest of the excavations at this site, very little information is available, but they can be said to not belong to the *in antis* type common across 3rd-millennium-BC northern Mesopotamia (Castel 2010: 127).

2.1.4.1. TAVO Survey of the Lower Khabur

Over the course of two seasons, in 1975 and 1977, the Altorientalisches Seminar of the Universität Tübingen conducted the Survey of the Lower Khabur, part of the overarching geographical research project “Tübinger Atlas des vorderen Orients”. Its initial focus was to be an analysis of sites along the Khabur river valley based on Middle and Neo-Assyrian textual sources, yet on the realisation of the dearth of recent research in this region (the last being a survey by Mallowan in 1936), its remit was expanded to become a general archaeological survey (Kühne 1974-77: 249). Encompassing mainly the immediate vicinity of the banks of the Khabur river, the survey’s boundaries stretched from the modern town of Hassaka in the north to the confluence with the Euphrates to the south, a distance of around 180km (see Fig. 1.3; Kühne 1978-79: 181). During the course of the fieldwork, a total of 129 tell sites (94 of them previously undocumented) were recorded, and the majority of them researched, both in terms of their topography (theodolite surveys) and material remains (intensive surface pottery collections; Röllig & Kühne 1983: 187). Yet the area of investigation of the TAVO survey expanded beyond the Khabur valley alone, especially during its second season, providing some results from the eastern fringes of the Western Jazira.

During its 1975 season, this survey investigated, in the form of brief visits, four tell sites in the Western Jazira located south of the Jebel Abd al-Aziz: Tells Mu’azzar, Mityaha, Murtiya, and Barud (see Fig. 1.5; Röllig & Kühne 1977-78: 125), the former two of which are “Kranzhügel” settlements, as previously recognised by von Oppenheim (Moortgat-Correns 1972: 33-34, 37). However, due to their location being outside of the survey’s primary area of investigation, as well as time constraints, these sites were recorded without a detailed topographic map or pottery collection. In the 1977 season though, the examination of the region south of the Jebel Abd al-Aziz became one of the specific goals of the TAVO survey, and although this could not be fully realised, the area was revisited. The sites of Murtiya and Mu’azzar were documented to the same criteria as all other sites of the survey, and in addition a new site, Tell Maraza, was recorded and fully documented also (see Fig. 1.5; Röllig & Kühne 1983: 192). Of these, only the latter is described in any detail in the survey’s published preliminary reports; as a small, nearly conical site with an extensive lower town, enclosed by a surrounding wall, attached on its northeastern side. The ceramics, Kühne (1978-79: 185) states, suggest that the site was occupied continuously from the EBA to the Islamic era.

Such brief site descriptions are all the TAVO survey provides when it comes to its published reports. Ceramics from the survey’s site surface collections were however analysed further in an unpublished M.A. dissertation by Gerti Preuss of Tübingen University, and it is here that a few chronological details on the five sites visited in the Western Jazira can be gleaned. This work focuses on the North Mesopotamian "metallic ware" pottery of the 3rd millennium BC, tracing the history of its recognition and evaluating its appearance at sites surveyed by the TAVO project as well as incorporating several comparative sites visited by the author. However, Preuss (1989: 7) recognises an exact physical and temporal definition of this ceramic type to be impossible, as at the time of the completion of her thesis "*der Stand der Ausgrabungen in Nordost-Syrien noch nicht weit genug fortgeschritten [war]*"[33]. Furthermore, Preuss (1989: 19) notes that no physical or chemical analyses could be carried out as part of her research[34], and makes clear mention of the lack of cohesive chronologies and ceramic type definitions in northern Mesopotamia (*ibidem*: 60-61). Such recognition of the limitations of the research is indeed perceptive, especially as it was written before the distinction between calcareous and noncalcareous metallic ware had been made. Thus this thesis can only be used to date sites to the 3rd millennium BC in general.

Metallic ware pottery was counted and analysed from four of the five steppe sites visited by the TAVO Survey: Tells Murtiya, Mu'azzar, Mityaha, and Barud (Preuss 1989: 9). With the exception of some from Tell Mu'azzar, all pottery sherds found were relatively small (< 35 cm^2), and together comprised 23 rims, five round bases, four flat bases, and 23 body sherds. The large majority of these originated from Tells Mu'azzar and Murtiya (23 and 22 sherds, respectively), while six were from Tell Barud and four from Tell Mityaha (*ibidem*: 99-107). These are all described in a fair amount of detail, describing colour, composition, and application (if any) of the interior and exterior of each sherd individually (*ibidem*: 91-127).

Due to the imprecise dating of the Northern Mesopotamian metallic ware at the time, little can be said about the settlement dynamics of these sites other than good evidence for their occupation during the 3rd millennium BC. As such, it provides useful, albeit hardly surprising information on human habitation around the Jebel Abd al-Aziz, as 3rd millennium occupation of large tells in this region, particularly those with "Kranzhügel" fortifications, had long been inferred from comparisons with the dynamics of Tell Chuera. Though later surveys in this region would shed greater light on these sites (in particular the Yale Khabur Survey; see Section 2.1.4.5), this initial foray into the Western Jazira laid the groundwork; piquing interest in a region that had been shown to be far more archaeologically complex than previously thought.

[33] "[the status of excavations in northeastern Syria was not yet advanced enough]"
[34] The results of Kühne and Schneider's (1988) analysis were still in press at the time; see Section 2.1.4.3.

2.1.4.2. The Sheikh Hamad Project's Investigation of Khirbet Malhat

One of the more remote of the known tell sites in the GWJ, Khirbet Malhat (see Fig. 1.5) is amongst the first to have been systematically investigated. Lying some 50km northeast of the Euphrates, 45km west of the Khabur, and 50km south of the Jebel Abd al-Aziz, the distance of this site from other known places of archaeological interest has resulted in it being rarely visited. Although von Oppenheim described the site as early as 1929, noting its polygonal form, large size (30ha) yet low elevation, and "Kranzhügel" structure (Moortgat-Correns 1972: 34-35), subsequent examinations of the region omitted it from their investigations. Even Poidebard, who took a detailed aerial photograph of the northeastern part of the site in 1927 (Poidebard 1928: Pl. LXIII 2), was not aware of its toponym, so that the image was not connected with von Oppenheim's descriptions for many years (Kühne 1983: 300). Yet enough awareness of Khirbet Malhat's existence was present in archaeological discourse to warrant visits, and subsequent surveys, of the site, starting in the 1970s and continuing in the 2000s (the latter described in Section 2.1.4.8).

In May 1978, a small team under the leadership of Prof. Hartmut Kühne of the Universität Tübingen visited Khirbet Malhat as a single excursion from the excavations at Tell Sheikh Hamad on the Khabur. The catalyst for this visit was interest arising from the isolated location and large size of the site – as did von Oppenheim, Kühne (1983: 301-302) placed great emphasis on the latter, specifically noting its diameter of around 630m. Also noted are the presence of an outer and inner wall, the latter of which encloses an unusually flat central "mound" (in reality lower than the wall itself), correlating with von Oppenheim's descriptions of half a century earlier. Kühne was keen to identify the periods of occupation at the site, and, although bad weather prevented the team from being able to conduct a systematic surface collection, the results obtained from random sampling validated and expanded upon von Oppenheim's descriptions[35]. The sherds and small finds examined were interpreted to indicate that settlement of some sort existed from the mid-Chalcolithic through to the Iron Age, although the greatest number of artefacts (including a bronze nail) stem from the EBA. The Chalcolithic, the MBA, and the Iron Age all present modest evidence for occupation, while the least well represented period is the Late Bronze Age (*ibidem*: 303).

Kühne (1983: 300) was further intrigued by Khirbet Malhat's extreme location, a region which he estimated today receives only between 100 and 200mm rainfall per annum

[35] Von Oppenheim believed Khirbet Malhat to have not been occupied for a long period of time; presumably being a stopping point on a through trade route. He further stated that when it was abandoned, it remained so for good (Moortgat-Correns 1972: 34).

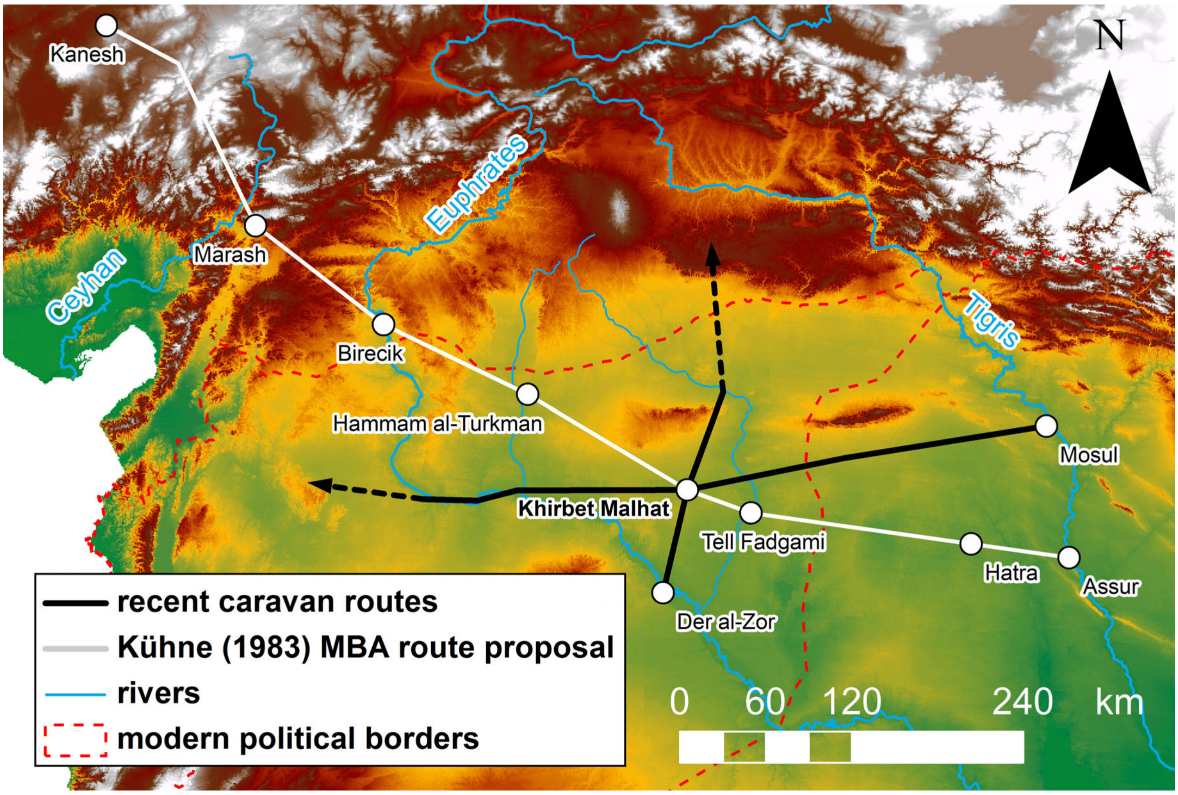


Figure 2.4: Map showing the recent caravan routes and MBA trade route via Khirbet Malhat proposed by Kühne (1983).

(see Section 1.2.2.2 for a more accurate picture of precipitation values in this area). This amount of precipitation is definitively below that required for sustainable agriculture in the region in modern times, and although animal husbandry could have provided sufficient economic returns for a settlement in this region, it could not, Kühne (1983: 302) reasons, account for Malhat's large size and complex form. The explanation proffered by the Sheikh Hamad team is that the site owed its importance to long-distance trade routes across the Jazira (*ibidem*: 303-306). Until very recently, two caravan routes intersected near the site – one north-south leading from Der al-Zor on the Euphrates to southern Anatolia, and one east-west leading from Mosul to western Syria (Fig. 2.4) – and Kühne (1983: 303) presumes this to have been the case in the Bronze Age also. In particular, it is argued that a reconstruction of the shortest route between Assur and the Assyrian trading settlement of Kanesh (Kültepe) passes through Khirbet Malhat[36] (Fig. 2.4). This, Kühne believes, explains the discrepancy between the sizes of Malhat and, for example, the much smaller Tell Mu'azzar on the slopes of the Jebel Abd al-Aziz; a morphologically similar site in roughly the same area, but not on an ancient trading route (*ibidem*: 306-308).

[36] The proposed path of this route relies heavily on the interpretations of two tablets forming a trade itinerary by Albrecht Goetze (1953: 72), who first proposed an Assur-Kanesh route running south of the Jebel Abd al-Aziz. For a more recent assessment of MBA routes in the region, see Palmisano (2015); discussed further in Section 5.3.1.

Not only would the hypothesis of a trading post explain why even such a geographically remote site could have attained supraregional importance, as Kühne (1983: 303) argues, but it also contributes towards an understanding its settlement dynamics. A great dependence on trade routes could explain both the sudden establishment of settlement as well as subsequent abandonment and lack of re-settlement as the presence of these routes fluctuated based on economic and political shifts occurring elsewhere. Thus, these initial investigations at Khirbet Malhat not only provide some useful, albeit minimal, data, but also bring attention to the significant factor that trade routes may well have had in shaping settlement dynamics in the Western Jazira; something that had not been explicitly stated in literature before.

2.1.4.3. The Sheikh Hamad Project's Regional Analyses

Another component of the Sheikh Hamad Project was a holistic analysis of the Northern Mesopotamian metallic ware, carried out by Hartmut Kühne and Gerwulf Schneider (1988: 84) with the co-operation of Peter Pfälzner and Heike Dohmann (later Dohmann-Pfälzner). These studies, comprising both typological and chemical investigations of metallic ware pottery sherds, involved the examining of material from various settlements across Northern Mesopotamia, including several within the GWJ. These included material from seven sites which had thus far undergone no modern archaeological investigations; Tells Dakhliz, Khanzir, Mabtuh Gharbi, Mabtuh Sharqi, al-Magher, Abu Shakhat, and Ghajar al-Kebir. Further material from the GWJ came from Tell Chuera, Tell Mu'azzar, Khirbet Malhat, and Ras al-Tell; sites from which ceramic material had previously been examined, but not analysed at the microscopic level (Schneider & Daszkiewicz 2001; Fig. 2.5).

Much of Kühne and Schneider's (1988) original report deals with the dating of the metallic ware and Kühne's defence of his chronological interpretations of the stratigraphic sequences which include this pottery type at Tell Chuera. The chemical analyses this investigation carried out on samples from all the abovementioned sites first distinguished between the calcium-poor "true" metallic ware and the calcium-rich metallic ware (see Section 2.1.3.1); a distinction otherwise unmarked by any feature visible to the naked eye (Kühne & Schneider 1988: 114-115). These separate pottery types were subsequently dated to earlier and later periods, first by Marc Lebeau (1990: 279-280), who distinguished the "céramique métallique de type Huera [*sic*]" from the "céramique métallique "akkadienne"", and later by Alexander Pruß (2000: 194-197), who refined the

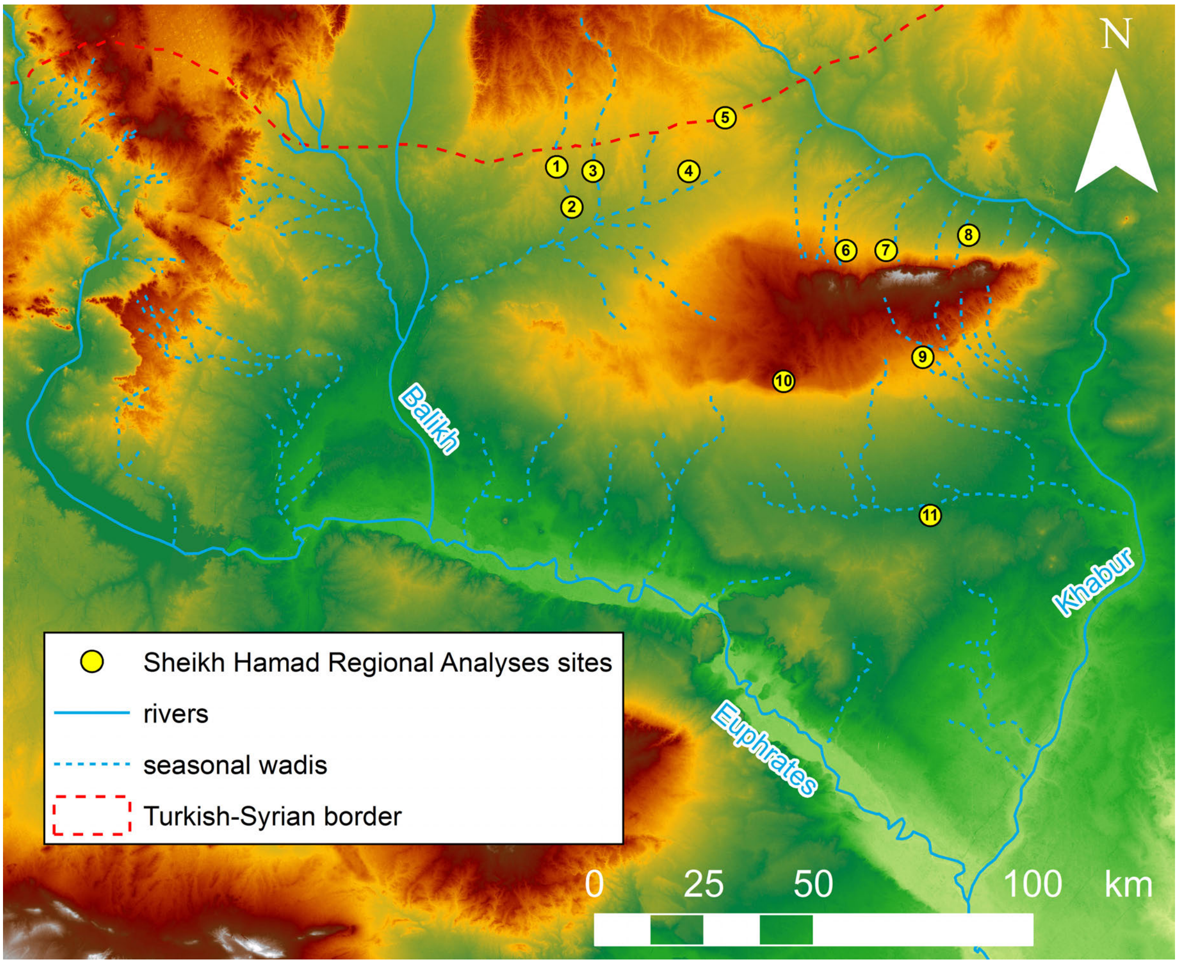


Figure 2.5: Map showing the sites in the Greater Western Jaziran steppe investigated as part of the Sheikh Hamad Regional Analyses.
1 - Tell Ghajar al-Kebir, 2 - Tell Dakhliz, 3 - Tell Chuera, 4 - Tell Abu Shakhat, 5 - Tell Khanzir, 6 - Tell Mabtuh Gharbi, 7 - Tell al-Magher, 8 - Tell Mabtuh Sharqi, 9 - Tell Mu'azzar, 10 - Ras al-Tell, 11 - Khirbet Malhat.

periodisation to EJ II-IIIb (ca. 2650-2150 BC) and EJ IIIb-V (ca. 2350-1900 BC), respectively. Thus this study, more than others before it, was the first to incorporate the Western Jazira from which at least somewhat accurate dating conclusions can be drawn. As such, it is extremely useful, even when analysing the same sites previously investigated by the TAVO Survey.

The analyses carried out by Kühne and Schneider (1988: 103-106) divide ceramics previously categorised as "metallic ware" based on appearance into nine chemical and four "archaeological" groups. Of the chemical groups, four belong to the "true" metallic ware, and five to the calcareous metallic ware. The "archaeological" groups, based on visual appearance and previous descriptions, are divided into one group that comprises both the noncalcareous and calcareous metallic wares[37], and three groups of calcium-rich ceramics,

[37] Previously generically termed "metallische Ware" in German and "stone ware" (Fielden 1977: 246-247) in English.

two of which are given new terms[38]; "Euphrat-Gruppe"[39] and the "Lidar-Gruppe"[40] (*ibidem*: 118).

Narrowing the sites down to those within the GWJ, and dividing the chemical groups into just two sections representing the noncalcareous and calcareous metallic wares gives the following results. By far the largest amounts of ceramics sampled are of the noncalcareous variety. These were analysed from Tell Chuera (18 samples), Khirbet Malhat (14), Tell Mu'azzar (6), and Ras al-Tell (1), as well as from the hitherto unresearched Tells Mabtuh Gharbi (8 samples), al-Magher (3), Dakhliz (2), Abu Shakhat (2), and Mabtuh Sharqi (1). Only from two sites in the GWJ, Tells Khanzir and Ghajar al-Kebir, were no metallic ware samples present, though that is not necessarily to say that the sites contain none of that material.

Far fewer samples of the later calcareous ware were available for this analysis, with none at all from Tells Mabtuh Gharbi, Mabtuh Sharqi, al-Magher, Abu Shakhat, and Ras al-Tell. Sites which included this ware did so in low numbers, these being Khirbet Malhat (3 samples) and Tells Chuera (2), Dakhliz (2), Khanzir (1), Mu'azzar (1)[41], and Ghajar al-Kebir (1).

Overall, this study was the first to, on a near-holistic scale, both confirm and narrow down the dating hypotheses existent since the 1950s. The large "Kranzhügel" settlements of Tells Abu Shakhat, Dakhliz, Mabtuh Sharqi, Mabtuh Gharbi, al-Magher, Mu'azzar, and Khirbet Malhat contained the same early-to-mid-3rd millennium ceramic material as Tell Chuera, suggesting a contemporaneous occupation, as had been expected from the sites' morphological similarities (see e.g. von Oppenheim in Moortgat-Correns 1972: 35; van Liere & Lauffray 1955: 140). More interestingly perhaps, the mid-to-late-3rd millennium ware exists at five tell sites (other than Tell Chuera), all of them large walled settlements, indicating a longer period of occupation than had been proposed (e.g. von Oppenheim in Moortgat-Correns 1972: 34-35).

Useful as this analysis is for proxy information on the periodisation of EBA sites in the GWJ, it must be emphasised that its main purpose was a scientific analysis of ceramic materials, in an attempt to more precisely define the Northern Mesopotamian metallic ware. As such, although the existence of pottery sherds from each of the two types at various sites indicates occupation during those periods, their absence does not indicate a

[38] The third, not given a term, is defined as Joan Oates' (1982: 206) "unusually fine pale grey stone ware".
[39] Possibly analogous with Kate Fielden's (1977: 249) "grey spiral ring burnish ware".
[40] This ceramic ware, the vast majority of which was found at Lidar Höyük in southern Turkey, is classified as "low calcium", as opposed to the other "calcareous" wares. It is nevertheless regarded as a subset of the latter (Schneider & Daszkiewicz 2001: 203-204).
[41] The only example of the "Lidar-Gruppe" in the Western Jazira (Schneider & Daszkiewicz 2001: 203).

lack of occupation. In other words, the samples analysed give no information as to the settlements' dynamics over time, and thus this study is a source of positive data alone, containing no negative or relational data.

2.1.4.4. The DAI *Survey in der Westjazira*

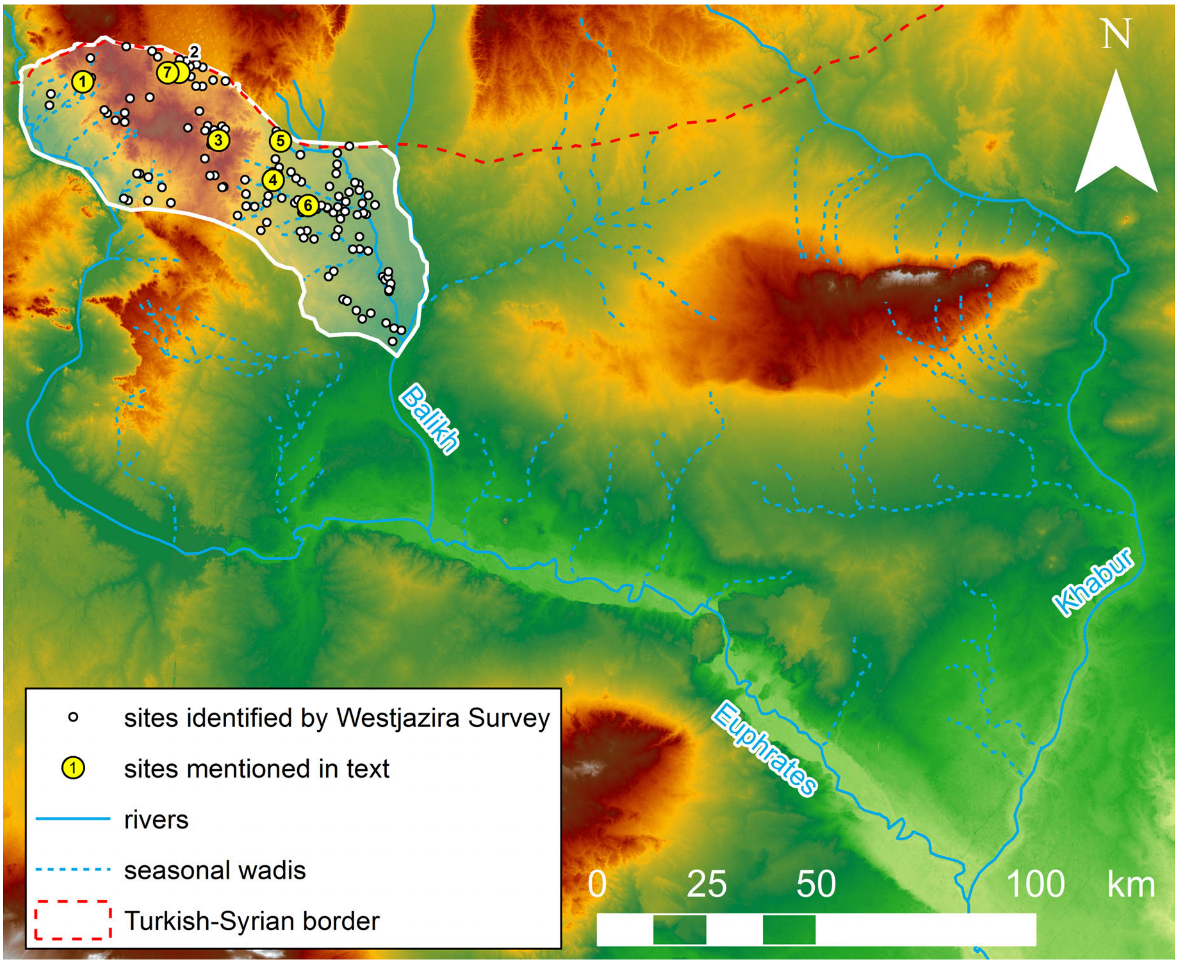


Figure 2.6: Map showing the extent of and sites identified by the *Westjazira* Survey. 1 - Tell Aukhan, 2 - Tell Hajib, 3 - Boz Hüyük Tahtani, 4 - Tell Matin, 5 - Tell Bandar Khan, 6 - Tell Kufaifa, 7 - Arslan Tash.

The first large-scale survey situated exclusively within the GWJ took place in the steppe between the Balikh and Euphrates rivers. This was conducted by the Deutsches Archäologisches Institut (DAI) under the leadership of Berthold Einwag over three field seasons between 1991 and 1992, and covered roughly the northern half of the region, documenting over 180 sites (Einwag 2000: 307, 312; Fig. 2.6). Einwag's (1993; 1993-94; 2000) three articles dealing with the survey emphasise the extremely varied nature of the landscape in question, ranging from a very fertile northern region to an arid desert steppe to the south, where, he believed, "*nur transhumante Wirtschaftsformen möglich sind*"[42]

[42] "[only transhumant forms of economy are possible]"

(*ibidem*: 308-309). Additionally, Einwag notes that rainfall levels can vary significantly year-on-year, with the 200mm isohyet, considered the minimum level of annual precipitation necessary for rain-fed agriculture, shifting as far north as the Turkish border in arid years (compare Section 1.2.2.2). Thus these reports are additionally some of the first to specifically note, in an archaeological context, the great variation existent in annual rainfall levels in the GWJ.

The results of the DAI survey are published only fragmentarily, but a large proportion can be pieced together from the disparate sources available. While Einwag's (1993) preliminary report briefly covers all periods represented from the Palaeolithic to the Islamic era, his (2000) article focuses on Iron Age sites and remains, providing additional data. Einwag's (1993-94) article constitutes a brief summary of the more detailed preliminary report of 1993. Meanwhile, the EBA sites documented by the survey have recently been analysed by Chistoph Fink, of the Johannes Gutenberg-Universität Mainz, whose database includes additional 3rd millennium sites not mentioned by the publications. A detailed analysis of all material collected was to have taken place in 2011, however the commencement of the Syrian war that year made this impossible (Fink, pers. comm. 21/06/2012).

Aside from one site, Tell Aukhan, whose Palaeolithic remains get a special mention (Einwag 1993: 30), the earliest widespread settlement evidence in this region dates to the Halaf period. A total of eight Halaf sites, all of them represented in the archaeological record by tells, are mentioned by Einwag (1993: 30-32). These are almost exclusively located on the Sarugh plain, the fertile uplands in the northwestern corner of the surveyed region (see Fig. 1.6). However, only two of these sites continued to be occupied during the succeeding Ubaid period, one of these being the 35-hectare Tell Hajib, which was continuously settled from the Halaf through to the Islamic era. Einwag (1993: 34) goes on to note that the drop in both settlement numbers and total area settled from the Halaf to the Ubaid is significant, but whether due to climate change or "*andersgearteten Standortfaktoren der 'Ubaid-Kultur*"[43] was to be determined by further analysis of the material. Similarly, very few sites were recorded from the Uruk period (4th millennium BC) – and those that were are mostly small (Fig. 2.7). Even the Uruk evidence from the continuously occupied Tell Hajib exists only in a small area within the site (*ibidem*). This would seem to correlate with evidence from the Western Jazira, where there is equally little evidence for late 4th millennium occupation. Whether there was an actual "break" in

[43] "[factors of a different kind that affected the distribution of the Ubaid culture]"

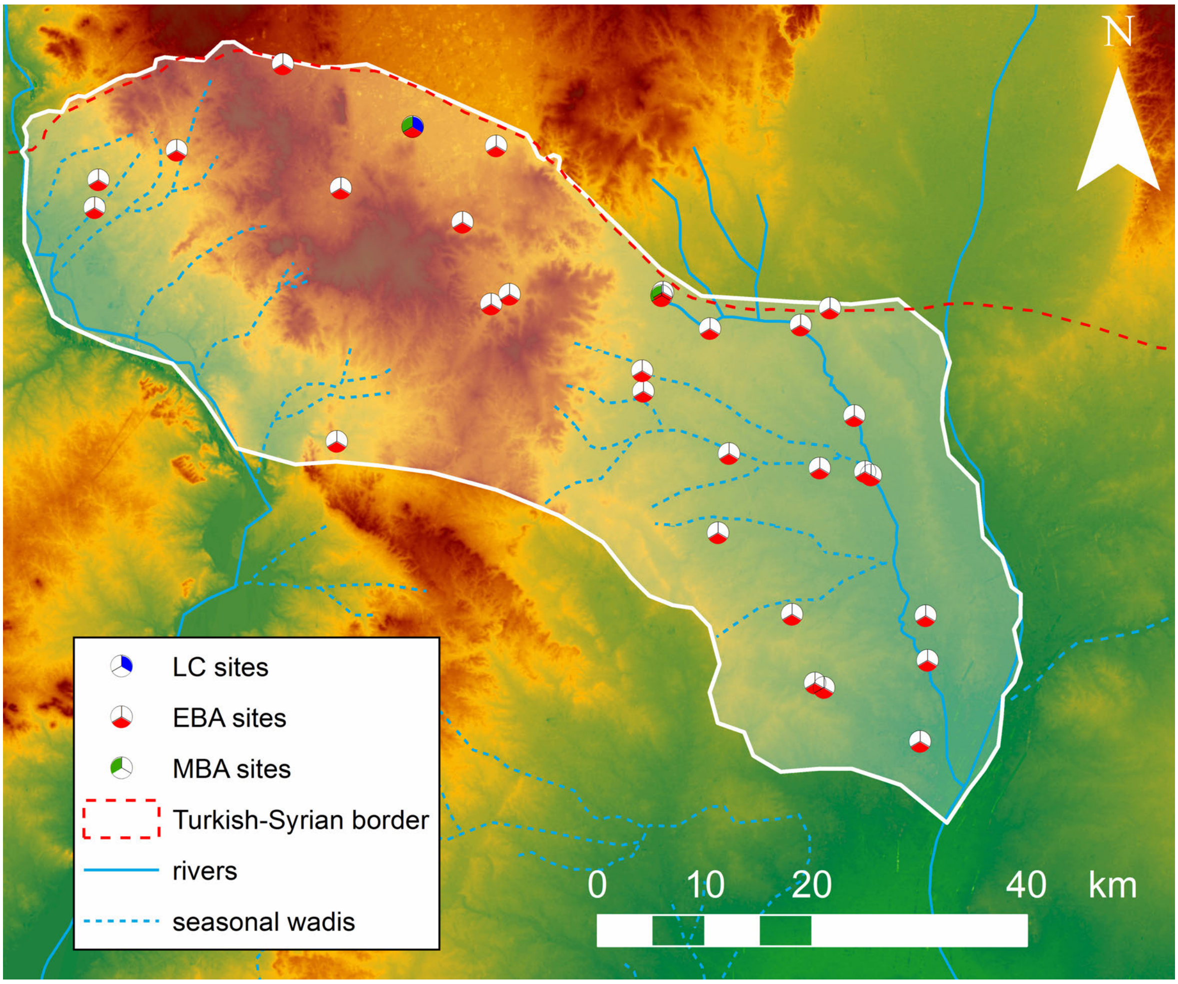


Figure 2.7: Map showing all sites of the LC, EBA, and MBA identified by the *Westjazira* Survey.

settlement between the 4th and early 3rd millennia, such as recorded at Tell Chuera (Section 2.1.3.1) cannot be ascertained from the preliminary evidence this survey provides, however.

Settlement in this region saw a significant increase during the EBA, with human occupation represented at 30 sites, far more than any previous period (Fig. 2.7). Nearly half of these sites, however, saw subsequent large-scale occupation during the Iron Age, thus obscuring Bronze Age features on the surface[44]. One site that was not occupied later on, Tell Kufaifa (35ha), is singled out by Einwag (1993: 34-35) as containing structures clearly visible as surface features. These comprised a surrounding city wall that appeared as a raised earthwork in the modern landscape, and multiple outlines of stone structures surfacing on the site's central mound. The low elevation of this mound led Einwag (1993: 35) to the conclusion that, despite its large structures and fortifications, Tell Kufaifa was not occupied for very long, while the lack of any evidence of a violent ending pointed to a

[44] Indeed many sites in this region are multi-period, with single-period sites clearly in the minority (Einwag 2000: 312).

planned abandonment. These properties, in combination, correlate with those of large sites in the rest of the GWJ.

Two other EBA sites are given individual mention by Einwag (1993: 35-37); Tell Matin and Boz Hüyük Tahtani. The former of these is one of the largest sites in the GWJ, measuring roughly 1000m by 750m, with an area of 63ha. The site's highest point is a small 3ha mound located off-centre within the large oval lower town, now covered by modern agriculture. Several stone blocks, many of them most likely still *in situ*, are distributed across the entire area of Tell Matin, allowing a partial reconstruction of the course of a city wall (*ibidem*: 35). The most recognisable stone structure is a temple *in antis*, aligned as per usual in an east-west direction, and dated to the EBA not only by its distinctive shape, but also its ceramic contents. The same ceramic dating applies to the majority of the structures in the lower town, with the exception of those on its western side, the pottery from which dates to the Roman-Byzantine era.

Regarding later Bronze Age periods, Einwag (1993: 37) states that the MBA (see Fig. 2.7) is well represented in the surveyed material, however he does not go into detail about the specific sites settled, save for Tell Hajib, which he mentions as having yielded one sherd of Nuzi ware. The existence of a significant amount of MBA settlement is a major departure from the pattern of the Western Jazira, which up to this period closely matches that of Einwag's survey region. The succeeding LBA receives no mention from Einwag in any of his three articles, and it can only be inferred that, at the very least, the multi-period sites of Tell Bandar Khan (continuous from the EBA to the Islamic era) and Tell Hajib contained material from this period. The Iron Age is well represented, with evidence for occupation at 47 sites, including the only excavated site, Neo-Assyrian Arslan Tash (Einwag 2000: 312; Thureau-Dangin 1931). However, the majority of sites recorded by the survey date to the Roman period and later (Einwag 2000: 309).

The impact of the DAI survey on the GWJ is no doubt significant, being the first survey, in a modern sense, to penetrate this area. As well as providing useful archaeological and chronological data, Einwag was the first to publish a description of the dry steppe landscape from a modern archaeological perspective. The data gathered by this survey can thus be used to inform investigations into the region in multiple ways. Furthermore, Einwag's survey had the potential to pave the way for further such investigations to be carried out in similar geographic and climatic regions of northern Syria. In the two decades since, however, only three other studies followed suit.

2.1.4.5. The Yale Khabur Survey

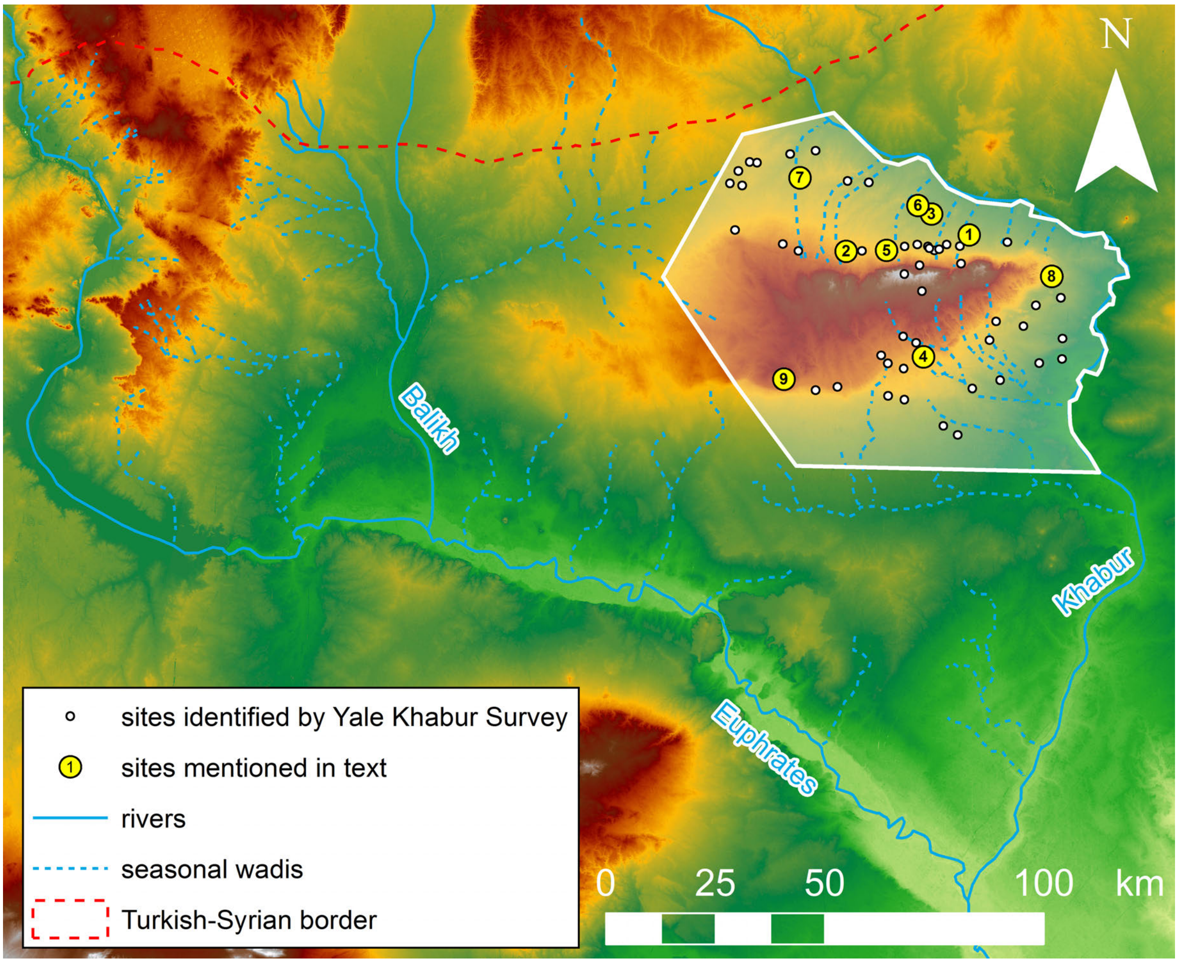


Figure 2.8: Map showing the extent of and mapped sites identified by the Yale Khabur Survey.
1 - Tell Mabtuh Sharqi, 2 - Tell Mabtuh Gharbi, 3 - Tell Hamam Sharqi, 4 - Tell Mu'azzar, 5 - Tell al-Magher, 6 - Tell Hamam Gharbi, 7 - Tell Qashgha, 8 - Tell Barud, 9 - Ras al-Tell.

In the mid-1990s, the second modern archaeological survey penetrated the GWJ. This was an investigation based around the Jebel Abd al-Aziz mountain range in the eastern part of the region, covering an area of just under 6000km^2 to its north and south (Fig. 2.8). Conducted by Yale University under the direction of Prof. Frank Hole, the survey comprised two seasons, during June and July of 1994 and 1995 (Hole & Kouchoukos 1996a). The area was mainly surveyed by vehicle, travelling along routes previously calculated by analysis of satellite imagery, using handheld GPS devices (Kouchoukos 1998: 367). A total of 271 sites dating from various time periods was recorded and integrated into a database which also included sites previously documented, bringing the total number to 282 (*ibidem*: Table 7.4). The results of this survey have never been fully published, appearing only in a brief form in two articles by Hole (1997: 42-56; 2002-03:

14-15) and the collected papers of the Khabur Basin Project[45]. As a result, only a subset of 57 of the discovered sites can be mapped. Much of the survey data relating to the Bronze Age was, however, extensively analysed and discussed in the Ph.D. thesis of Nicholas Kouchoukos (1998: 365-393), who had previously been a senior member of the field team. Thus, by piecing these sources together, a fairly complete picture of the survey and its results emerges.

The results of these indicate that human occupation around the Jebel Abd al-Aziz lasted from the Palaeolithic to the Islamic era, but was by no means consistent in distribution and number; furthermore "periods of settlement were often separated by centuries – during which time the area was either occupied by nomads or was abandoned" (Hole & Kouchoukos 1995: 1). By far the most extensive occupation occurred during the EBA (Fig. 2.9), Iron Age (Neo-Assyrian), and Byzantine/Islamic eras (Hole & Kouchoukos 1996a: 1-2). However, small early LC settlements also existed and were relatively stable. Hole (1997: 48-50) argues that the discovery of crabs and clams, species which require permanent fresh water, at sites dated to the 5th and early 4th millennia BC suggest a period of increased and more evenly distributed precipitation and perennial streams around the Jebel Abd al-Aziz compared to the present day. Furthermore, deposits of ca. two metres of gravel found atop several early 4th millennium sites indicate "violent flooding" caused by seasonal rains, which in turn would have carried a lot of water and material from the *jebel* to the Khabur river, allowing sufficient agriculture for long-term subsistence (Hole 1997: 48-50; Kouchoukos 1998: 227). However the late LC saw a dearth of settlement, and "despite extensive searching [the survey team] found no traces of later fourth millennium […] occupation of the Jebel 'Abd al-'Aziz region" (Hole & Kouchoukos 1996a: 2; Fig. 2.9). Hole (1997: 48) does not consider an RCC event explanation for this (i.e. the proposed "5.2k BP event"; see Section 1.2.3), instead hypothesising "violent fluctuations in the local environment".

This is contrasted against the dense occupation of the EBA, similar to elsewhere in the GWJ. Hole (1997: 52-56) initially states that 36 sites dating from between 2700 and 2400 BC were identified, some of them larger than 30ha. Amongst these, the largest include several tells of the "Kranzhügel" type such as Tell Mabtuh Sharqi (44 ha), Tell Mabtuh Gharbi (28 ha), Tell Hamam Sharqi (15 ha), Tell Mu'azzar (14 ha), and Tell al-Magher (13 ha). Several tells that are most likely not "Kranzhügel" were also identified, including Tell Hamam Gharbi (22 ha), Tell Qashgha (4 ha), and Tell Barud (3 ha). Further sites identified

[45] An earlier publication by Hole (1993-94) covers the initial work of the overarching Khabur Basin Project in a fair amount of detail, but was published before the survey portion commenced.

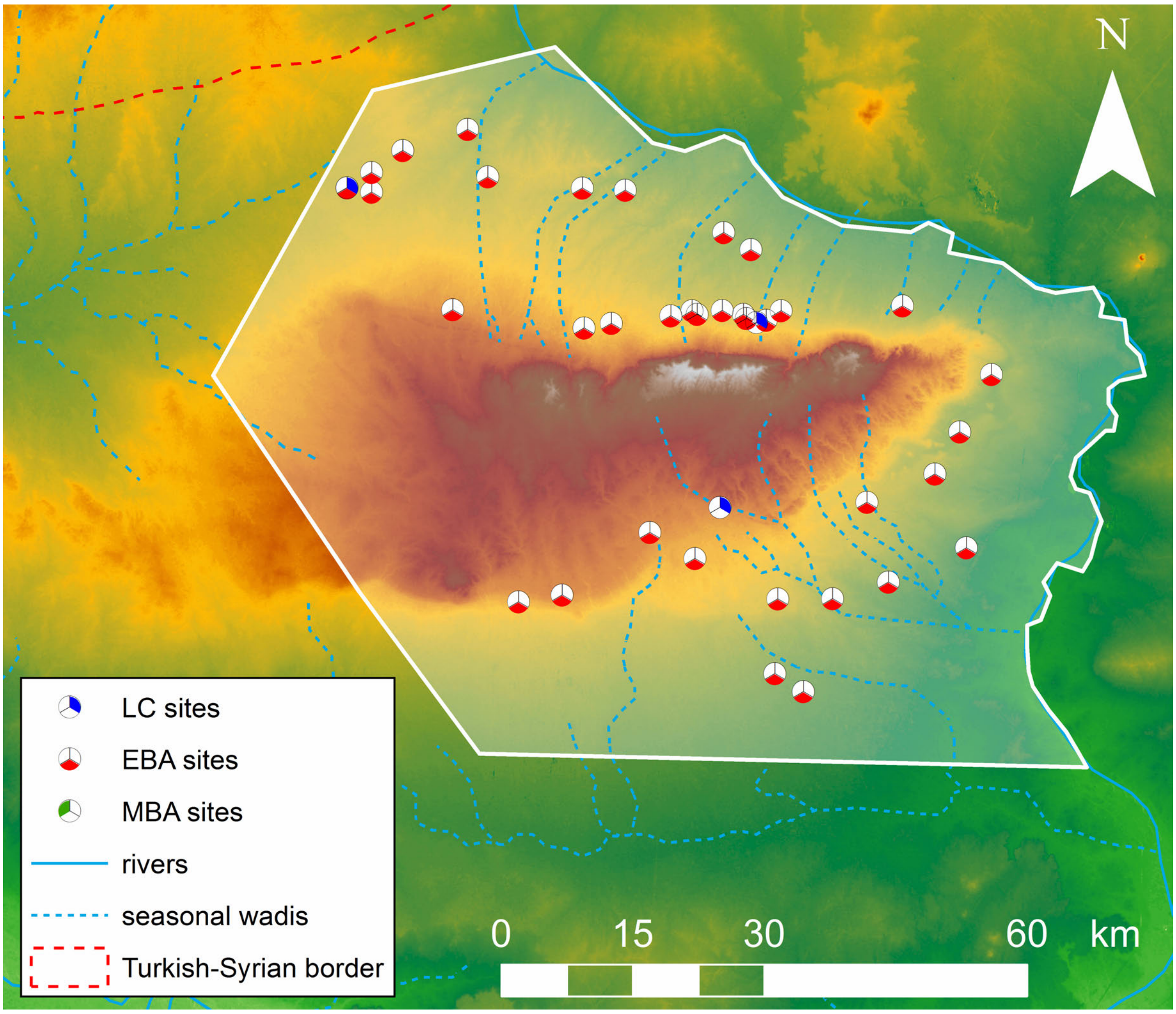


Figure 2.9: Map showing all sites of the LC, EBA, and MBA identified by the Yale Khabur Survey.

included flat settlements and hamlets (Hole & Kouchoukos 1995: 7). Local climatic reasons are again suggested for this settlement explosion, with a hypothesis of wetter conditions during the EBA than the present day. This is not based on direct evidence from the Khabur Basin Project, which Hole (1997: 56) admits is lacking, but rather the simple fact that "under today's [climatic] conditions the third millennium settlement [...] discovered could not occur". At the same time, however, Hole (1996: 6) does not discount political and economic factors, as he acknowledges the role of "nascent state economies [becoming powerful enough to] absorb some of the risk of cultivating marginal areas".

The Yale Khabur Survey faced a number of problems in dating the 3rd millennium sites in the Jebel Abd al-Aziz region due to their great distance from settlements with reliable EBA pottery chronologies. Therefore, seriation was applied to the surface pottery collected, using a similarity matrix processed through multi-dimensional scaling[46]. By verifying the results of this analysis with pottery types common to the early and late 3rd millennium at Tell Melebiya and Tell Raqa'i, respectively, Kouchoukos (1998: 373-374,

[46] See Kouchoukos (1998: 33-35) for a detailed explanation of this process.

Table 7.5) divided the EBA sites identified into two groups corresponding to the EJ I-II (2900-2550 BC) and EJ IIIa-IIIb (2550-2150 BC) periods as defined by Pfälzner (1997). Based on these results, all sites identified from the earlier period were found to be small and flat (none larger than 1ha), leading to the conclusion that they were "perhaps seasonally or transiently occupied" (Kouchoukos 1998: 373; Hole 1997: 52). All of the large tell sites (including the "Kranzhügel" settlements) identified by the survey appeared to date to the later period, so that the main 3rd millennium settlement and population explosion took place around 2550 BC. If this is indeed the case, and not an artefact of the methodology employed, it would indicate a marked difference from the Tell Chuera region, where large-scale occupation commenced at the outset of the 3rd millennium, if not up to a century earlier (Hempelmann 2013: 271-273). Kouchoukos (1998: 421-423) argues that this pattern is indicative of a delayed result of the late 4th millennium commodification of pastoral produce, citing Joy McCorriston's (1997) case for the growing value of wool as opposed to flax textiles. Evidence for this is drawn from the dominance of sheep and goat individuals in the faunal assemblage of Tell Chuera during this period[47]. Additionally, the spread of trade routes from Southern Mesopotamia to the north, caused by the former's development of an "interregional political economy", are identified as a major factor in encouraging long-distance trade both back to the region as well as within Northern Mesopotamia alone, creating further economic opportunities in the previously unfavourable steppe (Kouchoukos 1998: 432-433).

In accordance with the GWJ as a whole, all traces of permanent settlement had disappeared by the late 3rd millennium, and, with the exception of some "occasional sherds" (Hole & Kouchoukos 1995: 9), remained absent for the following 1500 years until the Neo-Assyrian period. This is largely put down to the "4.2k BP event" (see Section 1.2.3). Kouchoukos asserts that the resulting "rapid […] attenuated seasonality" at the end of the 3rd millennium BC could be enough to account for the abandonment of the steppe region, especially as settlements in that area would have been highly susceptible to such fluctuations. However, he also warns that "the local expression and social consequences of such changes can be quite complex", and stops short of suggesting that RCC was the "determinate force" in the settlement patterns observed (Kouchoukos 1998: 437). Instead, it is suggested that an additional factor could have been the expansion of the Akkadian Empire, the destructive effects of which are well documented by both textual and archaeological sources at Mari, Tell Bi'a, and Tell Brak (*ibidem*: 436). This, Kouchoukos argues, most likely severely disrupted trade routes across the GWJ, removing the economic

[47] However, it should be noted that more recent results from Tell Chuera put its emergence of high sheep and goat holdings nearly two centuries earlier (ca. 2700 BC; Section 2.1.3.1).

incentives of large-scale settlement in the region. When human occupation did reappear, it did not last more than a few centuries before the region was abandoned again, this time until the 2nd century AD (Hole & Kouchoukos 1996a: 1). In addition, the Neo-Assyrian period appeared to have a lower site density, with just 12 sites being identified by the survey. Settlement of the intensity of the 3rd millennium BC does not return until the Roman and Byzantine periods, which are represented by 31 sites. However, these are mostly small villages or camps, and not the cities of the EBA, indicating a much lower sedentary population (Hole & Kouchoukos 1995: 9-10).

Further sites beyond the Jebel Abd al-Aziz

Beyond the survey area mentioned above, a few further regions and sites are mentioned in Kouchoukos' thesis, some of which pertain to areas previously undocumented. Firstly, the religious site of Ras al-Tell is mentioned, and though it was not visited on the ground, its stone reliefs are estimated to date to around 2600 BC based on Moortgat Correns' (1972) interpretations, which makes them "contemporary with intensified settlement in the West Jazirah" (Kouchoukos 1998: 433-435). Secondly, the Wadi Hamar region (the area around Tell Chuera) is briefly discussed, and the sites of Tells Khanzir, Bogha, Abu Shakhat, Glei'a, and Dakhliz mentioned with reference to von Oppenheim, Moortgat-Correns (1972), and van Liere and Lauffray (1954; Kouchoukos 1998: 379-381). Further, the settlement pattern of this region is addressed based on the small section touched by the Yale Khabur Survey, with Kouchoukos (1998: 381-383) stating that the period of site occupation was longer here, with Halaf, Ubaid, and 4th millennium sites, absent in the greater survey region, being "quite common" in the Wadi Hamar – an assumption that is not in line with the results of more recent investigations (see Section 2.1.4.7). Kouchoukos also suggests that 3rd millennium settlement was denser than around the Jebel Abd al-Aziz (though not so much as to be comparable with the eastern Jazira), albeit admitting that "very little is yet known" about the distribution of smaller sites from this period (*ibidem*: 381).

Of greater usefulness to this study, Kouchoukos (1998: 386-387) also describes a region he terms the "Lower Jazira" – the large extent of steppe to the south and southeast of the Jebel Abd al-Aziz. This area, up until this time only touched on by interest in the site of Khirbet Malhat, is described as having comparatively high qualities and quantities of groundwater, suggesting the possibility of internal economies, rather than trade routes alone, accounting for the existence of large sites (*ibidem*: 386). As well as describing Khirbet Malhat (as a "classic Kranzhügeln [*sic*]" measuring 700 by 600 metres), Kouchoukos (1998: 386-387) makes mention of two further sites in the area: Tell Zahamak, 35km west of Malhat, and Tell Sha'ir, a further 35km west of Zahamak (Fig. 1.5). Both are listed in a table of 3rd millennium sites in the Western Jazira as being 500 by 450 metres in size and belonging to the "Kranzhügel" type of settlement (*ibidem*: 368-369, Table 7.4), though of neither (nor Malhat) is it stated whether they were visited on the ground. The former site most likely equates with "Tell Ezhamak" in Moortgat-Correns (1972: Karte II), although shown in a slightly offset location. This indicates that von Oppenheim, from whose reports the volume's map of the Western Jazira was drawn, visited and documented the site. The latter site, Tell Sha'ir, was visited by Gertrude Bell in 1911, who stated that there were no structures on the mound, but that recent digging had brought to light "a number of large stones" (Bell 1911: 65).

Conclusion

The Yale Khabur Survey was an important milestone in the archaeological investigation of the GWJ in a variety of ways. Most notably, it purposefully built upon past research, recognising the results of the longstanding excavations at Tell Chuera, and produced one of the few papers to reference van Liere and Lauffray (1955), and Lauffray (1963) up to that time (Hole 1997: 42-44). In doing so, it helped to bring research which had long remained in the German and French-speaking domains into the English-language purview. Additionally, and perhaps most importantly, it was well aware of its own limitations. Carrying out a survey of a nearly 6000 km^2 area over the combined time space of only four months, it cannot claim to be an intensive or all-encompassing work, and nor does it. Rather, the survey's reports emphasise its ability to corroborate general observations of settlement patterns in Northern Mesopotamia, such as the sudden growth and subsequent decline of settlement during the EBA, while admitting that "at present, the survey results do not allow us to distinguish the climatic, economic, and political factors leading to the establishment and eventual abandonment of third millennium sites in our survey area. Such questions require additional and tightly dated climatic records, finer periodization of survey collections, and fuller publication of excavated third millennium sites elsewhere in the Khabur" (Hole & Kouchoukos 1995: 8). The results do, however, provide an essential insight into the eastern area of the GWJ, as well as the first mentions of sites in the southeastern portion of the region. Additionally, the indication of regional heterogeneity with regard to the chronology of 3rd millennium settlement expansion, possibly occurring here several centuries after the Tell Chuera region, is an extremely important finding that contradicted previous assumptions and has significant ramifications for the study of this region.

2.1.4.6. The Sweyhat Regional Reconnaissance

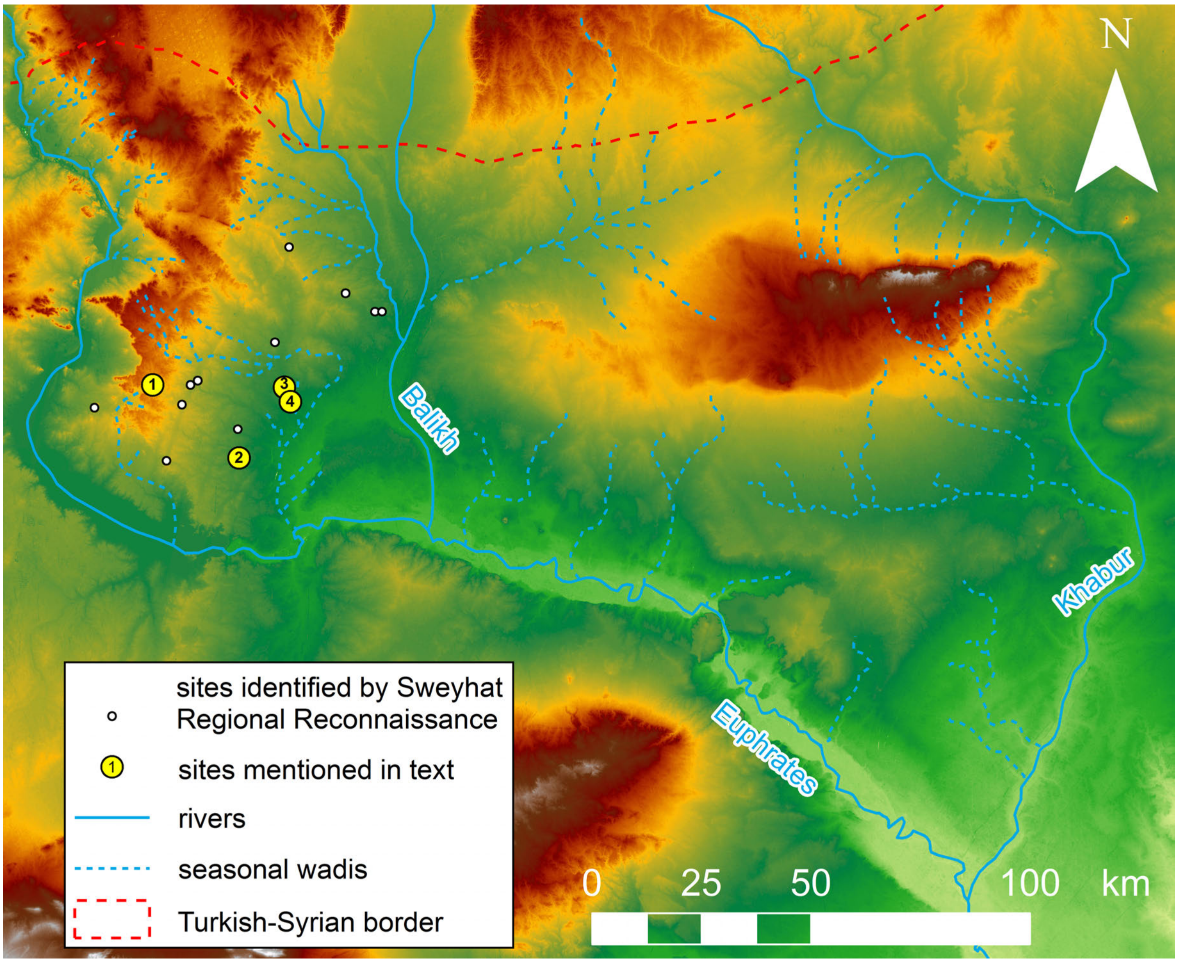


Figure 2.10: Map showing the sites visited by the Sweyhat Regional Reconnaissance.
1 - Khirbet Taha, 2 - Tell al-Hassan/Tell Jedi, 3 - Tell Shayir, 4 - Joub al-Shayir.

In 1996 and 1997, a regional investigation into the uplands east of Tell al-Sweyhat on the Euphrates took place under the direction of Michael Danti of the University of Pennsylvania. This survey partially covered a subset of the area encompassed by the *Westjazira* Survey as well as the region south of it, and focussed on EBA expansion into the area from the Euphrates valley, and additionally water sources in the southern uplands between the Balikh and Euphrates (Danti 2000: 266; Fig. 2.10). It was probably the first study in the GWJ to make use of remote sensing techniques, including French maps from the 1940s and SPOT satellite imagery, to preselect specific regions to be targeted by the ground survey. The study region was divided into a grid of quadrats grouped by environmental land use, and each of these was analysed using stratified random sampling (*ibidem*: 268-269). Thus this survey is mainly of use as a source of positive data alone, more akin to the site visits mentioned above. The results of the reconnaissance are only partially recounted in Danti's (2000) PhD thesis, with four of the EBA tells described in great detail, and a handful of other sites mentioned briefly in-text.

Of the 28 features documented, the majority of settlements were tells, of which 15 were identified. The remainder comprise pastoral camps of presumably late Roman or Byzantine date and "pastoral emplacements" of unknown date. Further features identified were tumulus tombs, wells, and a tower tomb or watchtower (Danti 2000: 271-272). Overall, the majority of sites were dated to either the EBA or from the Roman to early Islamic eras, correlating with the results of the *Westjazira* Survey. With regard to the former period, Danti (2000: 279) asserts that, although "highly tentative", early EBA settlements appear to be located closest to the Euphrates; that is to say furthest west in the reconnaissance area. One site is singled out to illustrate this; Khirbet Taha, a 3-hectare, 4-metre high mound with "unequivocal early-EBA occupation" (*ibidem*: 273; Fig. 2.10). Though earlier occupation at the site was not ruled out, Danti (2000: 273-274) is positive that it was not inhabited later, as no mid to late-3rd millennium remains were found.

The number of settlements was found to increase during the mid to late-3rd millennium, resulting in upland sites of larger size and further from the river valleys (Danti 2000: 279). Such a pattern would seem to correlate with that found around the Jebel Abd al-Aziz, but differ from the Tell Chuera region (see the next section). Illustrating this occupation period are three sites; Tell al-Hassan/Tell Jedi, Tell Shayir, and Joub al-Shayir (Fig. 2.10). The former site is the largest, its sherd scatter suggesting a size of between 5 and 10 ha. The stone foundations of several rectilinear structures were identified within the settlement, probably dating to the mid to late-3rd millennium. This occupation period was confirmed by diagnostic pottery sherds, which were dated to between the mid-EBA and the EBA/MBA transition period (*ibidem*: 275-276). The 2 to 3-hectare Tell Shayir was dated to the same periods, with some additional re-occupation during late antiquity (*ibidem*: 278-279). The final site, Joub al-Shayir, is a low mounded site on a high outcrop over a wadi, and located near a deep shaft dug into the rock, possibly the remains of an "ancient qanat system" (*ibidem*: 276-277). This may have been constructed during the Byzantine period, to which a few of the sherds on the site were dated. However, the majority of remains stemmed from the same periods as the above two tells.

This reconnaissance constitutes the first and only English-language investigation into the region between the Balikh and Khabur. However, its very precise objectives of investigating settlement movements into the uplands from the Euphrates during the EBA, combined with its sampling-strategy approach, set it apart from the broad, systematic methodologies of the *Westjazira*, Yale Khabur, and Wadi Hamar Surveys. Additionally, the circulation of the results of this investigation has been limited, with only a brief dissemination in an unpublished PhD thesis. Thus the impact of the Sweyhat Regional Reconnaissance on regional studies has been fairly minimal. Nevertheless, it provides a good supplement of positive data to the *Westjazira* Survey, providing additional information on dating and morphology to an area largely ignored by Einwag (2000: 309) due to his assertion that only nomadic subsistence was possible there.

2.1.4.7. The Wadi Hamar Survey

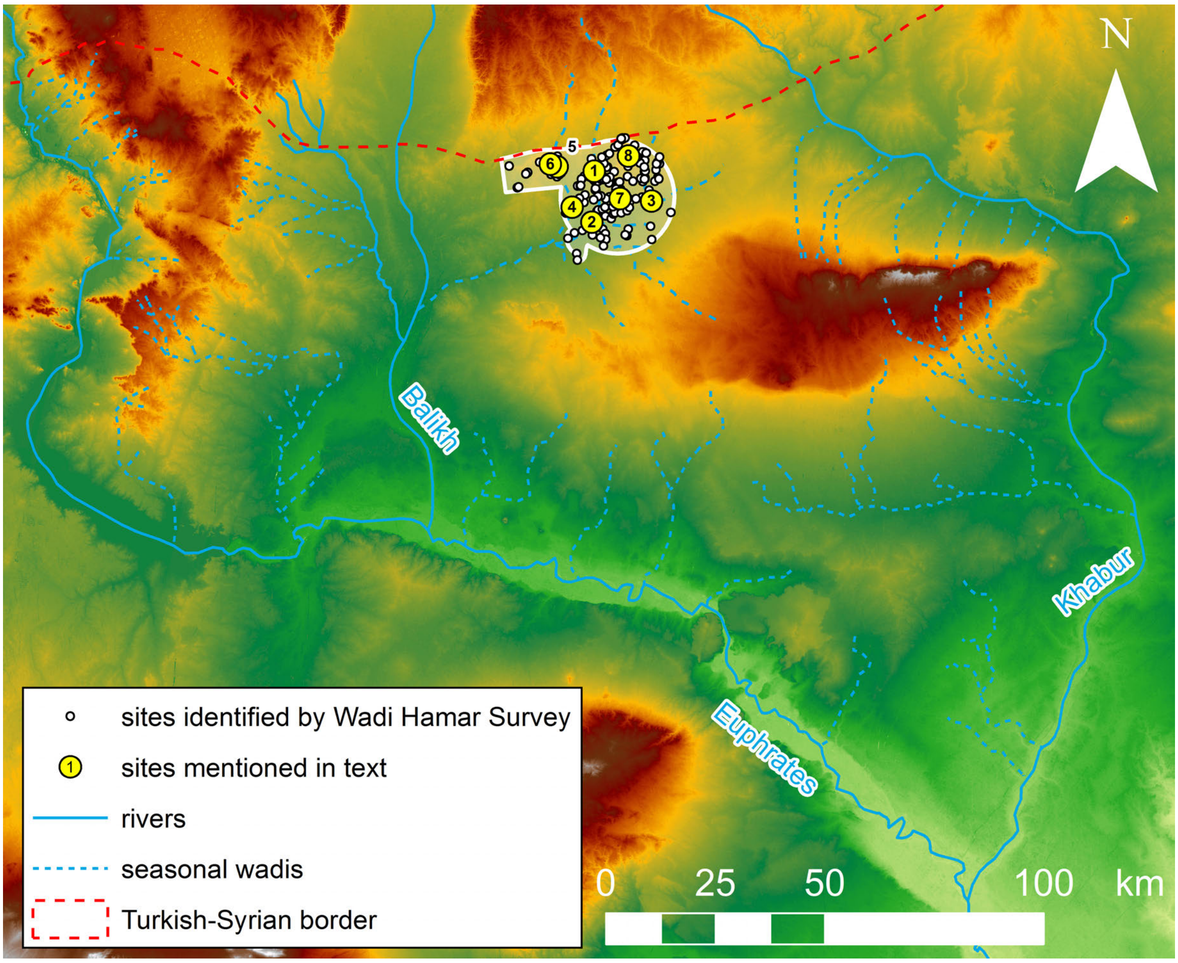


Figure 2.11: Map showing the extent of and sites identified by the Wadi Hamar Survey. 1 - Tell Chuera, 2 - Tell Tawila, 3 - ‘Ajila, 4 - Tell Dakhliz, 5 - Tell Ghajar al-Kebir, 6 - Msherifa, 7 - Tell Kharab Sayyar, 8 - Tell Harubi.

The third systematic survey to be conducted in the GWJ, which, with the exception of the abortive Khirbet Malhat Survey of 2010 (see the next section), is the only small-scale intensive one, was carried out in the area that has seen the longest continuous investigation: that around Tell Chuera. Despite ongoing excavations at the main site since the mid-1950s, and more recent ones at nearby settlements, its surrounding landscape was only investigated in a systematic, archaeologically-focussed way from the late 1990s onwards. Beginning in 1997, and lasting until the year 2000, Alexander Pruß and Tariq Nazir, as part of the Goethe-Universität Frankfurt's investigations of Tell Chuera, led a detailed survey in a 12km radius around Kharab Sayyar, 10km southeast of Chuera (Kudlek 2006: 23; Fig. 2.11). This region, covering an area of ca. 450 km^2 and investigated by a team of 4 to 5 people (Pruß 2005), is much smaller than either of the previous two surveys conducted in this region, and furthermore based in an area whose pottery chronology was already well understood from the excavations at Chuera. The survey area was subsequently expanded westwards (to a total surveyed area of ca. 680 km^2) in 2008-2009 by Veronika Kudlek, also of the Goethe-Universität Frankfurt, who additionally re-evaluated the results of the original project (Kudlek, pers. comm. 2010). While the earlier surveys were conducted by vehicle, with sites identified by sight and enquiries of local people (Kudlek 2006: 23-24), the later survey expansion was carried out mostly on foot, enabling the recognition of smaller, less prominent sites (Kudlek, pers. comm. Apr 2009).

Only few published sources on this survey exist, and those that do focus on specific aspects of the project only. Though the survey covered all periods present in the region (ranging from the Halaf through to the Islamic era), Kudlek's (2006) MA thesis covers only the EBA and Islamic periods, while Becker (2004) examines the Halaf and Ubaid. Meanwhile, Pruß (2005) provides an extremely brief two-page overview of the survey written for a non-specialist audience which is nevertheless the only source of published information on all periods of the survey, and the only information on subdivided periods within the EBA. However, by kind permission of Veronika Kudlek I have been able to obtain access to the complete corpus of raw data obtained by this project and am thus in a position to use them as the primary source of ground truth data for the GWJ. The results below have been obtained by a combination of the sources mentioned above.

The first period documented by the Wadi Hamar Survey is the Halaf, though it is quite feasible that earlier occupation of the region existed, as pre-Halaf periods were not the focus of the project. Fifteen sites dating to the Halaf period were documented, of which ten were resettled, after a hiatus, during the Ubaid period. None of the Ubaid sites identified were established *ex nihilo* (Becker 2004: 113). Thus the Halaf was a period of relatively high levels of occupation (Pruß 2005), while the subsequent Ubaid saw fewer sites of significantly smaller size (Becker *et al.* 2007: 258-263), a process described in greater detail in Section 2.1.3.3. It is in the following LC that the greatest reduction in population occurred, with only three sites (Tell Chuera, Tell Tawila, and 'Ajila South) dated to that period; a low number that corresponds with results from elsewhere in the GWJ (Fig. 2.12).

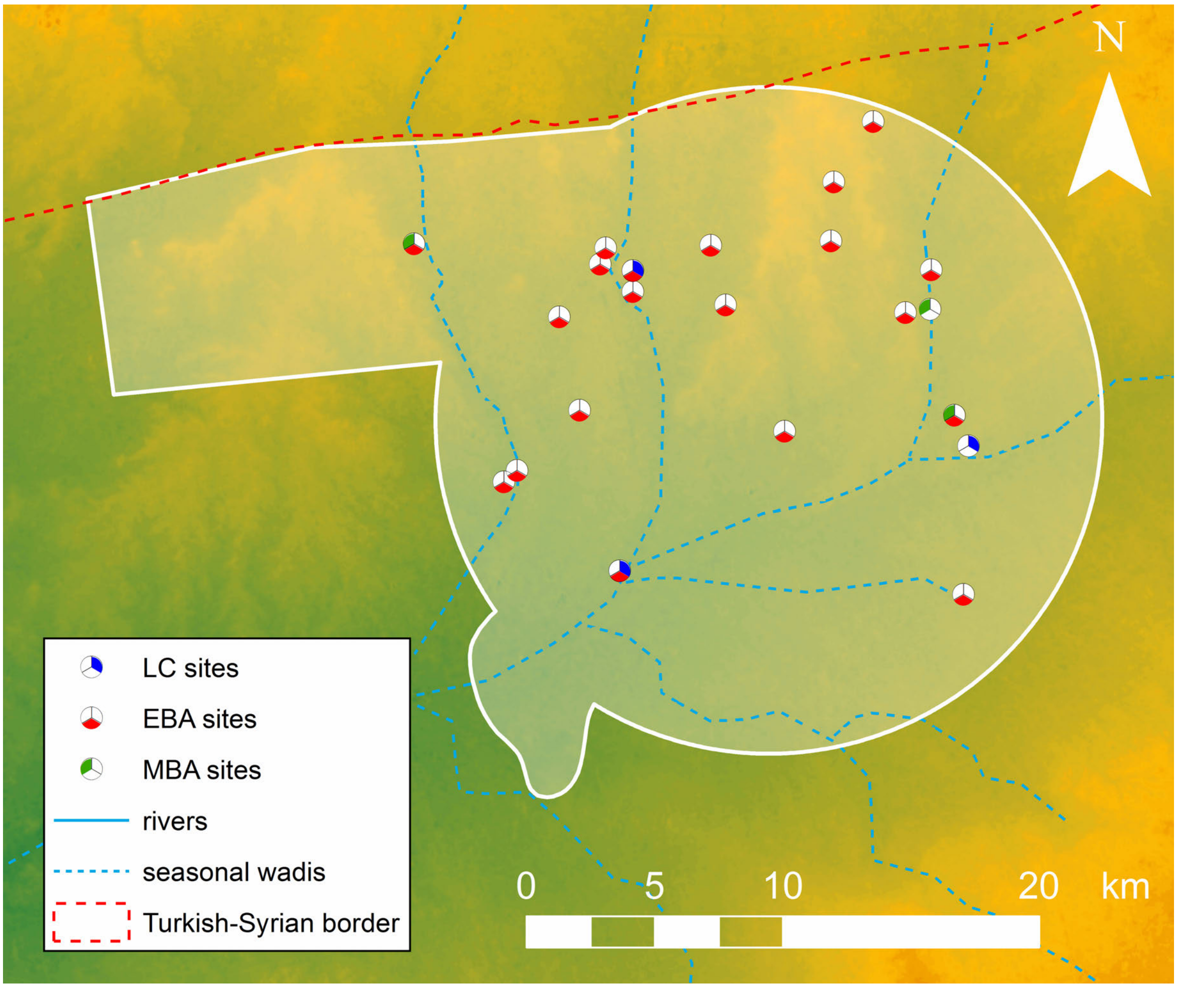


Figure 2.12: Map showing all sites of the LC, EBA, and MBA identified by the Wadi Hamar Survey.

Although the LC is the least well understood of the periods in the Wadi Hamar Survey, the few remains that have been identifed from Tell Chuera were tentatively dated to LC 2, with no evidence of later pre-EBA occupation (Meyer, pers. comm. Nov 2013; see Section 2.3.3.1). Thus, although this area was certainly not devoid of settlements during the entire 4th millennium, it can be surmised that an abandonment did occur at some point between LC 2 and the start of the EBA, put down to the "5.2 k BP event" by Hempelmann (2013: 271-272; see also Dohmann-Pfälzner & Pfälzner 2002: 12-14).

The number of settlements increases dramatically in the EBA, with 19 sites dating from 3100 BC onwards identified by the survey (Fig. 2.12). During this time, the survey area saw the establishment of several major tells, including Tell Chuera (25 ha, later 68 ha), Tell Dakhliz (23 ha), Tell Ghajar al-Kebir (20 ha), and Msherifa (14 ha), the former three of which were fortified with ramparts. Numerous small flat settlements from this period ranging from one to 12 ha in size were also identified, evenly distributed across the survey region.

However, the size (and therefore population) tier system of these settlements was mainly twofold. Following from calculations by Meyer (1996) based on the significance that fortifications lend to settlements[48], Kudlek (2006: 79-80) divided data from the Wadi Hamar Survey into first tier large sites, or "cities" (greater than 20 ha in size), second tier medium sites, or "towns" (first order "large towns": 10-20 ha; second order "small towns": 5-10 ha), and third tier small sites, or "villages" (under 5 ha). This resulted in a clear distinction between three "cities" (Tells Chuera, Ghajar al-Kebir, and Dakhliz), and numerous "towns" (e.g. Tell Kharab Sayyar, Tell Harubi, Msherifa). Only four sites in the survey area could be assigned to the "village" category, a pattern that Meyer and Orthmann (2013: 148) assume to be the case for the entire northern section of the Western Jazira.

Although the EBA is represented in this survey as the period with the second largest number of sites after the Islamic era, it actually represents the largest settled area with 211ha (Kudlek 2006: 121). After a modicum of occupation in TCH IA (see Tab. 2.1), many settlements were abandoned during the TCH IA/IB "crisis" (see Section 2.1.3.1; Hempelmann 2013: 192-193). From phases TCH IB alt to IC, human occupation of the survey area steadily increased, however, corresponding with the expansion of Tell Chuera. During the following TCH D, all of the smaller sites are abandoned, while the larger ones reduce in size (Pruß 2005). No archaeological evidence of any kind was found for occupation beyond Tell Chuera during TCH IE.

The results of geomorphological soil studies carried out as part of the Wadi Hamar Survey seem to suggest that all periods of high precipitation predate the 5th millennium; and that since ca. 6000 BC, the climate of the northern portion of the Western Jazira (at least) has remained stable, varying very little from present conditions (Weicken & Wener 1995: 304-305). Though a similar deep deposit of gravel as measured atop 4th millennium sites in the Jebel Abd al-Aziz area is documented on EBA settlements along the Wadi Hamar, winter rains of present-day intensity are considered to have been sufficient to produce this. More recent geo- and micromorphological investigations in the environs of Tell Chuera have come to the same conclusion (Fritzsch 2011; Krätschell 2011). Thus political factors are suggested as the chief causes of the 3rd millennium BC settlement pattern. Meyer (2010a; also Meyer & Orthmann 2013: 147) contends that the collapse of the influence of the Southern Mesopotamian city of Uruk on Northern Mesopotamia at the end of the 4th millennium BC not only gave rise to numerous local material cultures such as the "reserved slip" ceramics found at Tell Chuera, but also enabled proto-urban, followed by urban, development. Additionally, the sudden lack of a centralised power, and

[48] Meyer (1996) argued that settlements with fortifications must have been significant in the past regardless of their size, and hence are to be included in the first and second tier site categories in calculations; shifting also the boundaries of subsequent tiers.

the dominance instead of smaller political units presumably based on tribal structures, freed up formally unclaimed land in the steppe for exploitation by regional polities.

By contrast, the period of crisis of TCH IA/IB (see Section 2.1.3.1), is explained as a direct result of the risks and uncertainties involved in the colonisation of the steppe. Hempelmann (2013: 273-274) argues that the contemporaneous switch from supplementary gazelle hunting to near-exclusive sheep and goat cultivation (Tab. 2.2) was necessary due to the original system of grain redistribution being unsuited for the dry steppe area, into which the population had recently migrated. Thus an economic crisis was experienced as soon as the first dry spell occurred, caused not by large-scale climate change but by the normal year-on-year precipitation fluctuations (see Section 1.2.2.2). This impetus led to new strategies of risk management being developed, including specialised sheep rearing and the management of large herds (*ibidem*; see Section 1.3), enabling the population to overcome the crisis within a few centuries.

Regarding the region's abandonment during (or at the start of) TCH IE, Pruß (2013: 141-144; also Kudlek 2006) suggests that increasing aridity in the late 3rd millennium BC, although not specifically evidenced in the Wadi Hamar area, may have had a knock-on effect that forced its population to change its economic strategy, removing them from the archaeological record. Pruß (2005) also places equal causality with the pastoral overuse of marginal natural resources over a very concentrated area, as well as the expansion of the Akkadian Empire; also mentioned by Meyer (2010a: 28).

The following period, the MBA, sees a vastly reduced amount of settlement, with only three sites archaeologically attested, all of them reoccupations after a late 3rd millennium abandonment (Fig. 2.12). Evidence for occupation during the following LBA was found at four sites, which included the Middle Assyrian settlement of Tell Chuera (TCH IIA, IIB). Settlement density increases again significantly during the Iron Age, when, as elsewhere in the GWJ, occupation returns to levels close to those of the EBA, with 17 sites identified by the survey. This pattern of increase continues, and by the Islamic era around 50 sites existed in the area. The one point of continuity in this fluctuating pattern seems to have been the "Kranzhügel" site of Tell Ghajar al-Kebir, which shows evidence for continuous occupation, or at least some occupation of each identifiable typological period, from the EBA through to the Islamic era.

Though the data obtained by the Wadi Hamar Survey is difficult to access, with the raw data I have been privy to it provides some of the best ground truthing available for the GWJ. This is due in part to the intensive nature of the survey, taking place over several years in an area of considerably smaller size than the Yale Khabur Survey or the

Westjazira Survey. However, the most significant aspect that sets this investigation apart from others is its encompassing of a major site with a well-researched, established local chronology, which was naturally applied to settlements discovered in its hinterland. This lends greater credence to the accuracy of dating in the Tell Chuera region. Thus the Wadi Hamar Survey is an equal prime source of information for this thesis alongside remote sensing, the interpretation of which it is in a good position to inform (see Section 3.4).

2.1.4.8. The Khirbet Malhat Survey

The most recent investigation in the GWJ is a project led by Philippe Quenet of the Université de Strasbourg aimed at investigating the site of Khirbet Malhat and its environs; more than three decades after the visit by Kühne's team (see Section 2.1.4.2). In 2010, a preliminary investigation, which was to have served as a precursor to subsequent full-scale surveys in the following years, was carried out. The three main focuses of this project comprise a detailed examination of Khirbet Malhat, an intensive survey in a 20km radius around the site, and a general exploration of the surrounding area – a roughly rectangular region of 140km east-west by 80km north-south (Quenet & Sultan 2014: 119). Though the Syrian war has thus far prevented any of the planned follow-up research from taking place, the single season of fieldwork that was carried out nevertheless increased data on and understanding of Malhat and its surroundings considerably.

The examinations of the main site confirmed it to be a settlement with two fortification walls (as already noted by von Oppenheim and Kühne), and further determined the badly-preserved inner wall to be made of basalt, in contrast to the well-preserved mud-brick outer wall (Quenet & Sultan 2014: 121-122). The total size of the settlement was estimated to be 30ha, with the upper city alone measuring 5ha. As von Oppenheim (Moortgat-Correns 1972: 34) had previously noted, Quenet's team emphasised that the site is not circular, but polygonal, while the inner mound is a rounded square. While the lower town showed evidence of a network of radial and concentric streets, the upper town was found to be devoid of any recognisable features, save for a large oval shape in its centre. This has been tentatively suggested by Quenet and Sultan (2014) to be a central town square, much like the "Anton-Moortgat-Platz" in the upper town of Tell Chuera (see Meyer 2010d: 204; Fig. 2.3).

Contrary to Kühne's assertion of continuous settlement existing at Khirbet Malhat from the mid-Chalcolithic to the Iron Age (see Section 2.1.4.2), the survey team found no reliable evidence for dating habitation to the Chalcolithic. Instead, with the exception of "a handful of sherds [that] may belong to the 2nd and 1st millennia", Quenet and Sultan (2014:

122) interpreted the site to be occupied almost exclusively from EJZ 1-3b (ca. 2900-2350 BC). More precisely, results indicated the establishment of the upper town to date to the early 3rd millennium, and the expansion to the lower town to the mid-3rd millennium, followed by a definite abandonment by the start of the Akkadian period (ca. 2300 BC; *ibidem*). This process and periodisation would match fairly closely that of the Jebel Abd al-Aziz region (see Section 2.1.4.5), lending credence to the theory of a similarity in settlement processes in the eastern portion of the Western Jazira.

The results of the survey and regional exploration carried out simultaneously are less detailed, owing to its intended preliminary nature and large area of proposed coverage. Nevertheless, a number of settlements dated to the EBA and later (half of them to the Iron Age) were discovered within a 10km radius of Khirbet Malhat. All of these are very low mounds hardly visible from any distance, the vast majority of them located on the edge of the desert around the 180-200mm rainfall isohyets (Quenet & Sultan 2014: 120-121). Only one settlement, dated to the 3rd millennium, was found in the more fertile areas north of Malhat, suggesting perhaps a confirmation of Kühne's assertion that it was trading routeways, rather than agricultural potential, which sustained settlements in the Malhat region.

Khirbet Malhat is doubtless one of the more interesting sites in the GWJ due to its unusually large size for a remote region with very little rainfall. Thus having the advantage of ground truth data from this area is a significant one, and despite the cursory and preliminary nature of this modern archaeological investigation, it can be used to inform regional studies.

Section 2.2: Discussions of the Origins of Large-Scale Settlement in the Greater Western Jazira

2.2.1. Sedentarisation of Pastoral Nomads

Using data from the projects described in the previous section several authors have postulated and interpreted explanations for the rapid EBA expansion of large urban settlements observed in the GWJ. The concept of nomadic tribes becoming semi-nomadic agro-pastoralists, and constructing part-time settlements, is one such explanation that has been much discussed with relation to the Jazira in general, and to some extent the GWJ in particular. This has usually been described as a result of the collapse of the Uruk expansion, with Anne Porter (2002: 24-25) arguing that in the vacuum left by a departing regulated economic system, opportunistic pastoralists would have turned to cultivating the agricultural produce they had become accustomed to themselves. The search for suitable land for such activity would have led these to come into contact with greater numbers of other groups, leading to an increased need for territorial delineation and social cohesion. At a paper presented at the 2nd ICAANE conference in 2000, Jan-Waalke Meyer believed such processes to have been responsible for the establishment of Tell Chuera and other "Kranzhügel" in its environs; an opinion he however no longer holds (Meyer 2010d).

Such processes are invoked by Kouchoukos (1998: 396-438) as explanations for both the early EBA settlement increase and mid-EBA "Kranzhügel" formation around the Jebel Abd al-Aziz, stating that the "most probable explanation for these abrupt changes is an episode of polity formation among a largely pastoral population in the West Jazirah" (*ibidem*: 396). Evidence cited for this is more theoretical than based on data from the Yale Khabur Survey. Combining his argument for the commodification of pastoral produce during the 3rd millennium BC and the fact that initial EBA settlement in the Jebel Abd al-Aziz area comprised small sites, Kouchoukos (1998: 410-412) reasons that the commencement of a sedenterisation of transhumant pastoralists was more likely than "an intrusion of settlers into a region that was doubtless a wilderness". However, this theory requires the presence of relatively large populations in the region during the late 4th millennium BC, for which the Yale Khabur Survey found no evidence. This, Kouchoukos argues, is the result of settlements from that time being buried under at least two metres of gravel (see Section 2.1.4.5) as well as the general difficulty in identifying the presence of nomads in the archaeological record (see e.g. Cribb 1991: 65-83; Finkelstein 1992; Rosen 1992). With regard to the latter, Kouchoukos (1998: 437) reasons that as texts from Mari indicate that nomads occupied the GWJ during the reign of Shamshi-Adad (ca. 1813-1781 BC), from which period no evidence of human activity in the survey area exists either, the same could be true of the late 4th millennium.

More recently, Bertille Lyonnet has argued in favour of this explanation for the origin of "Kranzhügel" and other EBA circular cities in northern and central Syria. Based upon evidence from Tell Beydar, Mari, and Tell Rawda (none in the GWJ; see Fig. 1.4), she asserts that they were inhabited by semi-nomadic pastoralists who practiced agriculture as a secondary economy only (Lyonnet 2009: 190-192). Furthermore, it is suggested that the major purpose of the larger "Kranzhügel" sites was not settlement, but a gathering point for population groups usually living far from each other in the steppe, with fortifications to defend against attacks from other tribes (Lyonnet 2001: 22; 2009: 187-188, 190). The section of the evidence cited for this claim that relates to the GWJ is twofold, both from Tell Chuera: one, a very high percentage of caprine individuals in the faunal assemblage of the site, cited as evidence for its inhabitants having been pastoralists who did not engage in hunting; and two, the large area devoid of structures identified by geophysical survey at the tell's centre, equated with archaeological manifestations of the low density of settlement at Tell Beydar (Lyonnet 2001: 22-23; 2009: 186-188).

There are a number of problems with these interpretations, mostly down to more recent data becoming available. Firstly, caprines at Tell Chuera were indeed considered to have made up a significant 75% of individual animals in the faunal assemblage of the site by Vila (1995: Tableux 1 & 2) in the paper cited by Lyonnet. However, in the subsequent publication of more recent excavations, Vila's (2010) new results, coupled with a better-understood chronological sequence, show that sheep and goat numbers only reach such high levels after the first three centuries of EBA settlement, despite the presence of monumental structures and fortifications from the site's initial occupation (Tab. 2.2; see Section 2.1.3.1). Secondly, the large empty area at the centre of the site's upper town has since been interpreted as a monumental public square (the "Anton-Moortgat-Platz"), possibly associated with the nearby temple "Steinbau 6" (Hempelmann 2013: 16; see Fig. 2.3). Meanwhile the rest of the tell, despite indications that the lower town was less densely inhabited than the upper town, is hardly an empty site, as the geophysics show (Meyer 2010b). Thus although Lyonnet's (2009: 180) points about the roles of nomads and pastoralism in the establishment of settlements in the steppe are acutely valuable (see Section 5.2.4), and potentially applicable to the Jebel Abd al-Aziz area, the view that these factors were the major reasons for the establishment of "Kranzhügel" in the northern areas of the Western Jazira is somewhat lacking in evidence, and is not widely held amongst those working in that region.

2.2.2. Migration from Adjacent Regions

Though equating the establishment of large-scale settlement with the migration of populations which "brought the knowledge" can invoke the severe problems of a normative culture history approach (Anthony 1990: 895-897), solid evidence points towards this being the most plausible explanation for EBA settlement in at least certain parts of the GWJ. Danti (2000: 302-311), for example, sees the sites in the southern Balikh-Euphrates steppe as a direct result of long-term settlement along the Middle Euphrates, from which populations would have migrated into permanent upland settlements in search of space on which to graze increasingly large herds of sheep. This, it is argued, would have been a natural progression from previous transhumant practices of moving into the steppe during the spring for pastureland, and retreating back to the river valley during harvest to graze animals on crop residues (Danti 2000: 303-304). Evidence for this is found in the ceramic material that the Sweyhat Regional Reconnaissance found at upland steppe sites, which has very close analogies to material from EBA sites along the Euphrates, particularly beaded-rim and high-necked cups and jars (*ibidem*: 275-279).

Similar arguments are put forward for the Wadi Hamar region; however with the added question of the origin of urban planning knowledge. Meyer (2010d), counteracting his own earlier opinions (see above), asserts that the planned nature of Tell Chuera from its earliest EBA period (ca. 3100 BC) – including its street network, central axis, and massive town wall (see Section 2.1.3.1) – speaks against its founding by groups previously familiar with only the temporary structures of nomads. Further evidence supporting this assertion, Meyer argues, is the existence of a dense network of settlements in the immediate vicinity of the tell contemporaneous with the earliest period of Chuera. This fact is expanded upon by Hempelmann (2013: 187-193), who uses Henry Wright and Gregory Johnson's (1975: 267-268) definition of three levels of hierarchical administration being required for statehood. This Hempelmann interprets as equating with three settlement hierarchies based on site sizes (see Section 5.2.3), and asserts that such a tripartite structure existed in the Wadi Hamar area from around 3100 BC.

A colonisation of this sort has been interpreted as the result of the expansion of economically powerful regional economies into previously formally unclaimed steppe. Together with my co-authors, I have previously argued that when these polities, doubtless located in areas of stable water resources such as river valleys, became sufficiently large in scale, they became able to absorb the risks of colonising marginal environments where the chances of economic bust were great but gains from boom years were high (Smith *et al.* 2014: 158-159; Wilkinson *et al.* 2014: 92-97). One major impetus for such an exploitation of a previously unknown landscape could have been the extremely large size of livestock holdings of regional polities, as attested to by the example of the Ebla texts. Based on these, between 670,000 and 2 million individual sheep have been estimated to have been under the control of that state (see Archi 1993: 47; Milano 1995). The vast areas of land required to put such large flocks to pasture would have made the exploitation of semi-arid steppes an attractive endeavour (Smith *et al.* 2014: 166-168). The late 4th millennium shift from flax to wool textiles and subsequent commodification of pastoral produce (McCorriston 1997) again played a role here, driving the impetus for such an exploitation to take place around the time of the earliest manifestation of large-scale settlement in the GWJ.

The ability of such semi-arid regions to support large holdings of sheep and/or goats is attested to by examples from central Syria during the mid-20th century. This period saw a major increase in barley cultivation, which, by processes of extensification (see Section 1.3.2), expanded fivefold between 1950 and the late 1980s, including into regions with an average rainfall of under 200 mm per annum (Treacher 2000: 190-191). This practice naturally encroached upon regions previously reserved for pastureland; however these areas were able to be simultaneously used for barley crops and for grazing, providing animals with a fodder bonus – particularly during dry seasons of poor, otherwise unusable crop (Smith & Wilkinson in press). In a study of the small urban desert oasis of Sukhna, southwest of Der el-Zor (see Fig. 1.1), in the late 1980s, Françoise Métral (2000) observed this dynamic resulting in a concomitant intensification of sheep rearing and an increase in herd sizes, bolstered by a diversification in rearing practices such as the hiring of salaried semi-nomadic shepherds to manage herds owned by sedentary townspeople. Naturally, the chronological discrepancies between the 4th-3rd millennium BC and the 20th century AD are much too large to be able to speculate on whether similar practices could have been in use during the LC-EBA. What is clear, however, is that a significant increase in sheep holdings in the semi-arid steppe is not necessarily an indication of climatic conditions becoming more favourable, as pre-industrial methods of fine-tuning sheep rearing and holding practices are largely sufficient to account for such a dynamic. While such ventures naturally incur a wide range of risks, most of these can be coped with by the implementation of simple, yet effective, flexible management (Métral 2000: 141-144).

With these indications of colonisation being at least partly responsible for the establishment of large-scale EBA settlement in certain regions of the GWJ, the question remains of where these migrations originated. For the southern Balikh-Euphrates steppe, the similarities in material culture mentioned above clearly suggest a movement from the nearby Euphrates river valley. For the Wadi Hamar region, a migration of longer distance and larger scale is postulated. Based on similarities in the material culture of the earliest periods of Tell Chuera, including *cyma recta* bowls, Karababa ware, and the noncalcareous metallic ware, several papers have proposed that the founders of that site and its environs came from the Upper Euphrates in southern Anatolia, some 170 km to the north-northwest (Hempelmann 2013: 272; Meyer & Hempelmann 2006: 30). Specifically the origins of the noncalcareous metallic ware (see Sections 2.1.3.1, 2.1.4.3) have been studied in-depth. While this ceramic material is distributed across the majority of the GWJ as well as the

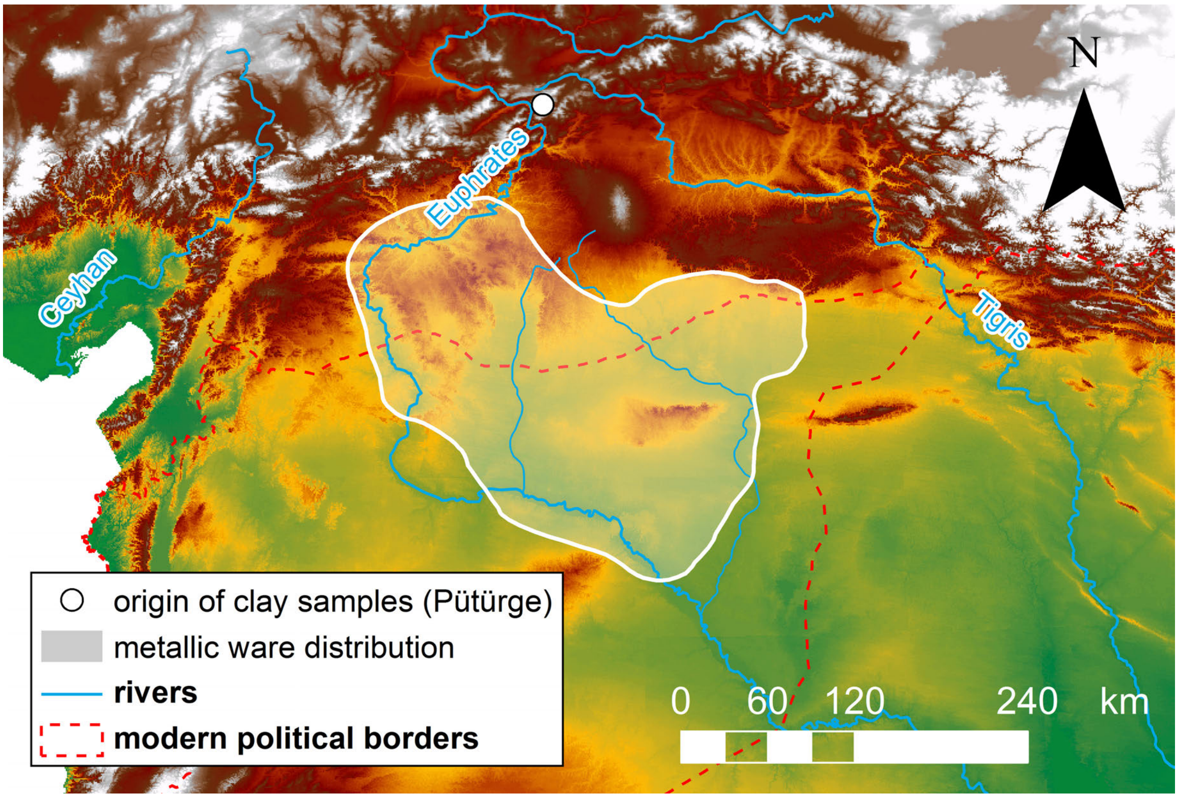


Figure 2.13: Map showing the distribution of the noncalcareous metallic ware and the area from which the clay samples discussed originate (simplified from Kibaroğlu *et al.* 2008: Fig. 4).

Euphrates near Lidar Höyük, geochemical analyses have shown it to bear closest connections with clay samples taken from the Pütürge mountains around 30 km south of the present-day Turkish town of Elazığ (Fig. 2.13; Kibaroğlu *et al.* 2008).

The apparent necessity that the founders of Tell Chuera, and presumably other Wadi Hamar "Kranzhügel", had prior experience of urban planning is cited as further evidence for their origins lying in southern Anatolia. Settlements along the Middle Euphrates and Balikh river, it is argued, saw a hiatus in occupation as a result of the retreat of the Uruk expansion, and, with the exception of Tell Bi'a (see Fig. 2.2), these regions did not see urban centres again until the second half of the 3rd millennium BC (Meyer 2010a: 19-20; see also Ur 2010b). Along the Upper Euphrates, by contrast, inhabitants were not only familiar with aspects of urban planning, but settlements were less affected by the collapse of the Uruk network, with many occupied continuously from the LC through to the EBA (Hempelmann 2013: 272). Thus urban centres such as Hassek Höyük, Kurban Höyük, and Arslantepe would have been inhabited by populations with the necessary know-how to construct planned settlements such as the initial town of Tell Chuera (including its massive fortification wall), as well as had sufficient urban populations to instigate a "colonisation" of the steppe at the end of the 4th millennium.

Section 2.3: Chronologies

2.3.1. Overview

The issue of archaeological chronologies across landscapes is always a complex one, and generally involves a significant degree of uncertainty and compromise in marrying various methodologies and interpretations. This is especially true of Northern Mesopotamia, where excavated sequences from individual sites until recently made up all the phase-based ceramic typologies in self-contained fashions. This makes comparison across the region a tricky prospect, both between different excavated sites and between excavations and surveys. For the latter, a major factor is the geographical distance between the survey area and the nearest excavated site, which may or may not be representative of a wider archaeological landscape (Kouchoukos 1998: 367-371). Additionally, there is the issue of taphonomic processes of stratified contexts being very different from those of surface finds (Lawrence 2012: 73-74). This can lead to the misidentification of pottery types, but also bias in the material record, where remains of more durable fabrics are overrepresented while less durable ones may become entirely absent (Postgate 1994: 48-51). Moreover, these specific issues do not even touch on holistic theoretical problems incurred by phase-based chronological construction, such as the erroneous appearance of step-by-step typological changes in material (Plog & Hantman 1990: 440-442) or the false appearance of contemporaneously inhabited sites that were in fact occupied at different times within the same chronological period (Lawrence 2012: 75-76; Schacht 1984).

With the above firmly kept in mind, it is however possible to postulate and flesh out a workable chronology for the GWJ. Indeed, this task is somewhat simplified by the fair amount of work that has already been carried out in this direction in Northern Mesopotamia, though little of it relates specifically to the geographical region of study. An overview of the chronologies used by the excavations and three main surveys employed for analysis is provided below, with specific emphasis on the LC and EBA. For these periods, the specific chronologies used in this thesis are additionally explained, along with how they were created and adapted for use in the GWJ.

2.3.2. Pre-Late Chalcolithic Periodisations

The majority of excavations and surveys used by this thesis do not dwell on phases preceding the LC in much detail. However, periods from the Palaeolithic onwards are recorded, and thus subject to at least rudimentary chronologies. Both the *Westjazira* and the Yale Khabur Surveys identify the Palaeolithic as the earliest represented period on account of typological and technological characteristics of lithics (Einwag 1993: 30; Hole

& Kouchoukos 1995: 3). While the former project simply uses the generic descriptor of "*Paläolithikum*", the latter specifies that the material found dates to the Middle Palaeolithic, put by Hole and Kouchoukos (1995: 3) to earlier than 30,000 BP. The Yale Khabur Survey also records lithic scatters with "small crude bladelet cores with steeply angled platforms" of the Epipalaeolithic, which it tenuously links to the Natufian period and dates to after 12,000 BP (Hole 1994: 331-333; Hole & Kouchoukos 1995: 3). Similarly for the Neolithic, Einwag (1993: 30) merely mentions the existence of "*neolithische*" sites in the *Westjazira* Survey, while greater detail is gone into by the Yale Khabur Survey, which splits the period into its pre-pottery and pottery phases. For the former of these, the standard PPNA/PPNB divisions are used. Within the survey region, only PPNB (ca. 7600-6000 BC) is present, represented by surface scatters of projectile points of the characteristic Byblos variety as described by Cauvin (1978: 94-96; Hole 1994: 333-337; Hole & Kouchoukos 1996: 2). The Pottery Neolithic is also represented, described as "Hassunan" (6th millennium BC) by Hole and Kouchoukos (1996: 2), though this is not subdivided into the chronological "standard" and "archaic" Hassuna phases (see Lloyd & Safar 1945: 261-262).

The Halaf (ca. 5900-5300 BC) saw the first widespread occupation of the GWJ, and thus the three main surveys and two of the excavations contain material from this period. These mostly employ the generic term "Halaf" to describe the appearance of the characteristic painted ware (Dohmann-Pfälzner & Pfälzner 2002: 12-13; Einwag 1993: 30-32; Hole 1997: 50; Hole & Kouchoukos 1995: 3-4) without referring to the various proposed subdivision phases (see Campbell 2007). The Tell Tawila excavations and the Wadi Hamar Survey, however, do divide the period into the Halaf Ia, Ib, and IIa/b phases developed by Stuart Campbell (1992 cited in Nieuwenhuyse 2000: 155-158), which they define as "*beginnende Halaf-Zeit*", "*Früh-Halaf*", and "*mittlere bis späte Halaf-Zeit*", respectively (Becker 2004; Becker *et al.* 2007: 236-245). The same is true of the subsequent 'Ubaid period, with only these two projects subdividing the generic term, in this case into the 'Ubaid 3 and 4 periods (ca. 5300-4400 BC) from the chronology defined by Joan Oates (1960).

2.3.3. The Late Chalcolithic

2.3.3.1. The Santa Fe Chronology

Until the late 1990s, there was no clear consensus on the relationships between either local or Uruk-style LC ceramic typologies, and thus no regional chronology (Lawrence

2012: 84). This changed with the creation of the LC chronology developed in 1998 at that year's School of American Research Advanced Seminar in Santa Fe, New Mexico, which combined a variety of excavation data and radiocarbon dates across the Mesopotamian region (Rothman [ed.] 2001). The inclusion of several sites in the Jazira as part of this project (see Rothman 2001: 7, Table 1.1) facilitates its use for analysing settlements in the GWJ. Thus despite difficulties in directly translating the sparse evidence of LC occupation in the region with this chronology (see next section), it is clearly the best option for this thesis in order to enable holistic regional comparisons.

The chronology is split into five phases: LC 1 through 5, spanning the period of ca. 4400-3000 BC, each representing between two and four centuries (Schwartz 2001: 236-246). Phases LC 1-3 are defined as pre-Uruk, while the last two phases feature major instances of Southern Mesopotamian-style ware (see Tab. 2.4). The first phase, LC 1, is the latest one in which Ubaid-style pottery is represented, with some continuity of material culture in the form of the distinctive painted motifs of the former period. However, these become rarer in assemblages from the second half of the phase (ca. 4300 BC onwards), and disappear altogether by the end. At the same time, there is the emergence and increasing abundance of undecorated hand-made mineral-tempered bowls as part of the "broader coba bowl tradition" (Stein 2012: 132-139). However, it is during LC 2 (from ca. 4200 BC onwards) that the standardised medium and course chaff-tempered variety of this ceramic type becomes extremely common, with coba bowls making up a large part of the assemblage together with carinated bowls and internally-bevelled rounded bowls. These vessels are undecorated and often evidently mass-produced, and can be considered clear indicators for the LC 2 across the entire Jazira including at Tell Zeidan (see Fig. 1.5), Tell Brak, and the "southern extension" of Tell Hamoukar (see Fig. 1.4; Schwartz 2001: 237-238). They are not exclusively comprised of rough ceramics, however, as the existence of Tepe Gawra-style double-rim pot fine ware shows. This mass production of pottery with a seemingly mostly purely functional purpose speaks of the formalised political consolidation of the contemporary "*époque proto-urbaine*" (Butterlin 2003), coupled with the emergence of extensive trade networks used for these everyday commodities along with elite goods (Stein 2012: 136).

The subsequent LC 3 is a difficult phase to identify in ceramic assemblages for a variety of reasons. Firstly, although it sees the appearance of some new forms of pottery, such as carinated "casseroles", hammerhead bowls, large simple-ware jars, and interior corrugations, older forms that originated in LC 1 and 2 continue to be in use also; and furthermore the course chaff-tempered ware type remains consistent throughout (Schwartz

2001: 238-241). Secondly, these stylistic subgroups are not homogenous, but vary across Northern Mesopotamia. This leads LC 3 to be easy to identify at some sites such as Tell Brak, but very hard to distinguish at others, including Tell Chuera (Stein 2012: 139-141; see Section 2.3.3.3). Finally, defining of the end of this phase based on ceramic material is particularly unclear due to both the continuing production of chaff ware of a very similar type to that described above and the emerging mixed assemblages together with Uruk ware (Schwartz 2001). Such issues are heavily compounded in the next LC phase.

Uruk or local Late Chalcolithic?

LC 4 (ca. 3600-3400 BC) sees the first major appearance of Southern Mesopotamian-style Uruk ware[49] in Northern Mesopotamia, comprising amongst other material thin-walled conical bowls with pouring lips, squat jars with red slip, tall-necked thin-walled jars, and most distinctively mass-produced bevelled-rim bowls (Schwartz 2001: 241-242), often interpreted as bread moulds (see e.g. Millard 1988). These are relatively easy to identify when they constitute a direct superimposition of Southern Mesopotamian elements on local culture; a rare occurrence, however (Frangipane 2009: 31-35). More often, they appear in mixed assemblages together with the local chaff-faced pottery described above. Indeed, non-Uruk ceramics from this period are hard to distinguish from many pre-Uruk local variations that sprung up at any time during LC 1-3, as these continued to be produced despite the change in regional power, which furthermore was not imposed in equal measure or by equal methods on all settlements (Butterlin 2003: 246-254; Frangipane 2002). Thus even amongst the Uruk-style ware there are numerous variations produced at sites influenced by, but not under the direct control of, the Uruk state. This situation continues during the succeeding LC 5, from which Uruk ceramics, comprised mainly of tall bottles with drooping spouts found at settlements in the Middle Euphrates area, are fairly clearly identifiable (Stein 2012: 140), but local ware remains constant from LC 4. Though it is well documented that Uruk ware (of the early Late Uruk - pre-Uruk IVa period) disappears from the vast majority of Northern Mesopotamia by ca. 3000 BC, after which only Tell Brak sees any ceramic continuation (Schwartz 2001: 242-245), the chronological divisions of LC 4/5 are extremely fuzzy.

Together, these issues result in three major problems when it comes to defining material from LC 4 and 5. Firstly, although Uruk-style ware can be identified with relative ease, it is hard to say without extensive excavation whether this constitutes the site of a

[49] Of the Middle-Late Uruk variety by Southern Mesopotamian typologies.

conquered settlement, a colony established *ex nihilo*, or a trading enclave within or next to an independent local settlement (see Stein 2012: 141). Secondly, while the presence of Uruk material is a clear indicator of LC 4/5 settlement, its absence is hardly proof of a lack of occupation if "earlier" chaff-tempered ware is present, which could date to a wide chronological range of over a millennium (Schwartz 2001). Thirdly, even if local LC occupation of a more recent date than LC 3 is identified, it is extremely difficult to distinguish LC 4 from LC 5. The infeasibility of conducting the intensive ceramics analyses required to mitigate the above issues, especially for surveys, has led to a propensity for misdating this ceramic material, as has the general lack of available data from this period. This makes tracing settlement trajectories during LC 4/5 extremely tricky.

2.3.3.2. LC Periodisation in the Greater Western Jazira

As the Santa Fe chronology is still relatively recent, older excavation and survey data from before the late 1990s did not have a chance to employ this standardised system. Furthermore, even recent projects have not always made use of it, due mostly to the extreme paucity of material from this period in the GWJ. The lack of material available for study has led to the LC being a poorly understood period in the steppe regions, and thus comprehensive precise dating is unfortunately not possible.

The chronological descriptors employed for the LC in the GWJ are varied, yet are all either imprecise or incomplete. All three surveys and two of the excavations contain material from this time period, and these distinguish "Uruk" ware from other material, though whether this term refers specifically to Southern Mesopotamian styles or to the time period associated with its influence is largely unclear. Further inconsistencies in the descriptions used also exist. The *Westjazira Survey* lists a few sites from the "*Uruk-Zeit*", indicating a late 4th millennium occupation, however does not explicitly state the absence of early LC material (Einwag 1993: 34). Considering the otherwise detailed chronological narrative of Einwag's article, the jump from discussing the 'Ubaid to mentioning the Uruk period is jarring, and leads to the possibility that "*Uruk-Zeit*" may be being used as a synonym for the entire LC here[50]. One exception is the site of Tell Hajib, Einwag's (*ibidem*) description of the material from which clearly refers to Uruk-style ware of LC 4/5. The Yale Khabur Survey, on the other hand, clearly distinguishes earlier LC finds from Uruk and late-4th millennium material, and it states that none of the latter was identified anywhere in the survey area (Hole 1996: 5; 1997: 48-50).

[50] This is not a unique situation; see for example Wilkinson and Tucker's (1995: 43-45) use of the term "northern Uruk" to describe pre-(southern) Uruk local LC wares.

The excavations at Tells Chuera and Tawila, and by extension the findings of the Wadi Hamar Survey, make some use of the Santa Fe chronology, providing more precise data. However, this is still very sparse. Remains of LC occupation at Tell Chuera uncovered in 1997 were dated to a "*frühen Phase des Späten Chalkolithikums*"[51], equated with Period V A at Hammam al-Turkman on account of the appearance of coba bowls (Dohmann-Pfälzner & Pfälzner 2002: 12 fn. 28; see Akkermans 1988). Later excavations produced a greater amount of LC ceramics, which by comparison with material from Habuba Kebira, Hacinebe Tepe, Hammam al-Turkman, Hassek Höyük, Tell Leilan, and Tell Zeidan was tentatively dated to LC 2 (Babour in Hempelmann 2013: 35-36; Meyer, pers. comm. Nov 2013). This correlates with both the Hammam V A phase and the common prevalence of coba bowls during LC 2 (Schwartz 2001: 237-238). Taos Babour (in Hempelmann 2013: 36) emphasises the lack of any LC material that can be definitively ascribed to LC 3 or later.

The excavations at Tell Tawila uncovered similar coba bowls, which however were dated to LC 1 based on the existence of this ceramic form at Tepe Gawra level XII (Rothman 2002: 55). However, as these vessels are most common to LC 2 at nearby Hammam al-Turkman (while Tepe Gawra lies over 300 km away; see Fig. 1.4), this would seem to be an equally likely phase to date these to (Schwartz 2001: 236-238). The assertion that the levels of Tell Tawila containing coba bowls date to around 4000 BC further support this widening of periodisation (Becker *et al.* 2007: 235). Uruk ware is not mentioned at all with regard to the Wadi Hamar region.

2.3.3.3. Synthesis and Integration of LC Chronologies

Though none of the LC periodisations of the fieldwork employed in this thesis use systematic subdivisions, most can be correlated with the Santa Fe chronology to some extent at least (Tab. 2.4). The most vague is the *Westjazira* Survey, for which, despite the use of the term "*Uruk-Zeit*", the best guess is a single phase covering the entirety of the period. The Yale Khabur Survey's data can be transposed as two phases, one covering LC 1-3 and one covering LC 4-5, from which no material was recorded (Hole 1996: 5; 1997: 46-52). However, this does not entirely preclude the possibility that later ceramic material of a local LC variety that may have been a continuation of earlier types was not distinguished by the survey.

[51] "[early phase of the Late Chalcolithic]"

<table>
<tr><th>years BC</th><th colspan="2">Santa Fe chronology</th><th colspan="2">Tell Chuera excavations</th><th>Tell Tawila excavations</th><th>Westjazira Survey</th><th colspan="2">Yale Khabur Survey</th><th>Wadi Hamar Survey</th></tr>
<tr><td>4400</td><td colspan="2" rowspan="2">LC 1</td><td rowspan="5">frühe Phase des späten Chalkolithikums</td><td rowspan="2"></td><td rowspan="5">"LC 1"</td><td rowspan="8">"Uruk-Zeit"?</td><td colspan="2" rowspan="8">post-Ubaid 5th-4th millennium</td><td rowspan="8">Spätchalkolithikum</td></tr>
<tr><td>4300</td></tr>
<tr><td>4200</td><td colspan="2" rowspan="3">LC 2</td><td rowspan="3">LC 2 (?)</td></tr>
<tr><td>4100</td></tr>
<tr><td>4000</td></tr>
<tr><td>3900</td><td colspan="2" rowspan="3">LC 3</td><td colspan="2" rowspan="10"></td><td rowspan="10"></td></tr>
<tr><td>3800</td></tr>
<tr><td>3700</td></tr>
<tr><td>3600</td><td rowspan="2">LC 4</td><td rowspan="7">Uruk Expansion period</td><td rowspan="7">Uruk-Zeit</td><td rowspan="7">later 4th millennium</td><td rowspan="7">Uruk</td><td rowspan="7"></td></tr>
<tr><td>3500</td></tr>
<tr><td>3400</td><td rowspan="5">LC 5</td></tr>
<tr><td>3300</td></tr>
<tr><td>3200</td></tr>
<tr><td>3100</td></tr>
<tr><td>3000</td></tr>
</table>

Table 2.4: LC chronological divisions used by projects in the GWJ (compiled from Becker *et al.* 2007; Dohmann-Pfälzner & Pfälzner 2002; Einwag 1993; Hempelmann 2013; Hole 1996, 1997; Schwartz 2001; several personal communications).

The excavations at Tells Chuera and Tawila base their assertions of LC occupation mainly on the presence of coba bowls, correlating with phases LC 1 and 2. This is despite the term “LC 1” being stated as the only phase in the Tawila publication (Becker *et al.* 2007: 235). Additionally there is the tentative identification of some of the Chuera material as LC 2. However, as this involves only positive data, it is possible that later occupation during the hard-to-define LC 3, or even LC 4/5 (with local LC material), existed also. The Wadi Hamar Survey simply uses the broad term “*Spätchalkolithikum*”, however the abandonment of the area before the commencement of the Uruk period proposed by Hempelmann (2013: 271) would narrow this down to LC 1-3. Once again, it is impossible to be completely certain that no occupation continued into LC 4/5 for the reasons discussed above. The absence of any Uruk-style material from the entire GWJ (save for Tell Hajib), as well as the temporal break in settlement documented by excavated stratigraphic layers at Tell Chuera (Section 2.1.3.1), does however largely remove the need to tackle the issues surrounding the definition of LC 4 from LC 5 and the nature of Uruk influence. In the absence of any clear positive evidence from excavation or survey data, this thesis operates under the preliminary assumption that settlement during the last two LC phases is unlikely for most of the GWJ.

2.3.4. The Early Bronze Age

2.3.4.1. The ARCANE "Early Jezirah" Chronology

Background and development

The chronological conventions of the EBA in the Jazira were until recently dictated largely by excavation results from the 1930s. Although broadly correct, these failed to provide fine distinctions between sub-phases, account for regional variation, or define the preceding and succeeding transitional periods (Rova 2011: 49). Following several analyses in the 1970s and 80s of individual sites such as Tell Chuera (Kühne 1976), and ceramic types such as the metallic ware (Kühne & Schneider 1988; Preuss 1989), the creation of a regional sequence was first attempted by Peter Pfälzner (1997, 1998; Dohmann-Pfälzner & Pfälzner 2001: 105-110; see also Lebeau 2000). His *Frühjazira* (EJ) chronology (discussed in greater detail in Section 2.3.4.2), as well as the outcomes of a 1998 colloquium on the "*Chronologies des pays du Caucase et de l'Euphrate aux IV^{e}-III^{e} millenaires*"[52] held in Istanbul (Marro & Hauptmann [eds.] 2000), formed the basis upon which more recent consensuses on Northern Mesopotamian chronologies have been developed (Pruß in Lebeau 2011b: 11-12). This has led to the development of the Jazira section[53] of the wide-ranging "Associated Regional Chronologies for the Ancient Near East and the Eastern Mediterranean" (ARCANE) project, which has produced a synthetic chronology for the region based on objective observations of ceramic typologies (Lebeau & Sakal 2004-2014; Lebeau [ed.] 2011).

In keeping with the strategy of the wider ARCANE project, the "Early Jezirah" chronology was created by analysing drawings of ceramics and taking objective measurements of proportions. This avoided the problems incurred by chronologies developed by focussing on pottery morphologies alone, such as the creation of "nicknames" for typological varieties which can easily be misinterpreted and applied indiscriminately across heterogeneous assemblages[54] (Rova 2011: 50-51). Such comparisons of a wide range of material from various excavated sources, including Tells Chuera, Beydar, Arbid, Brak, Barri, and Leilan, allowed the identification of diagnostic types for each chronological period created.

[52] "From the Euphrates to the Caucasus: chronologies for the IVth-IIIrd millennia"
[53] It should be noted that this is not the only relevant chronology for the GWJ, which also encompasses part of the region of the ARCANE "Middle Euphrates" periodisation; see Section 2.3.4.3.
[54] Such as the two varieties of "metallic ware"; see Section 2.1.3.1.

The chronological phases

Six major phases, labelled EJZ 0 through 5, were created for this chronology, divisions of which bring the total number of sub-phases to 10. In order, spanning the dates of ca. 3100 to 2000 BC, these are: EJZ 0; EJZ 1; EJZ 2, Final EJZ 2; EJZ 3a, EJZ 3b; EJZ 4a, EJZ 4b, EJZ 4c; and EJZ 5 (Tab. 2.5). Each features distinct diagnostic material, though several continue to be in use alongside others over several phases. These shifts in ceramic wares often occur concurrently with major events in regional politics or settlement dynamics, and are correlated with these by Elena Rova (2011: 52-65). An overview of these defining factors, with a focus on those pertaining to the GWJ, is provided below (collated from Lebeau 2011a; Meyer 2011; Rova 2011).

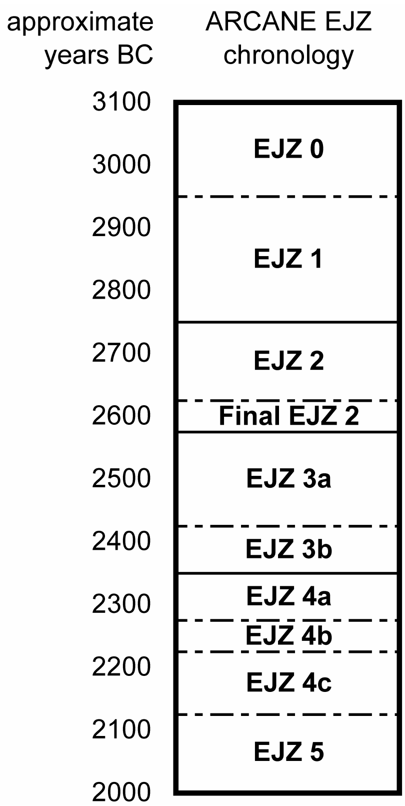


Table 2.5: ARCANE EJZ relative chronology table (adapted from Lebeau 2011a: Table 1).

EJZ 0 (ca. 3100/3000-2950/2900 BC): Immediately following the collapse of the Uruk expansion, EJZ 0 is the least well understood Jaziran phase created by the ARCANE project. Its definition is based on late/post-Uruk morphological types and early variants of what was to become Ninevite 5 ware. However, these types have only been evidenced at Tell Brak, and even if it is assumed they existed elsewhere, were most likely restricted to the eastern half of the Jazira. The GWJ, on the other hand, has none of these ceramics, although it was occupied during this phase. The Middle Euphrates-style reserved slip ware and cyma-recta bowls that are representative of the earliest EBA phases at Tells Chuera and Kharab Sayyar are not included in the "EJZ 0 ceramics" definition, and the limited data makes it impossible to create connections.

EJZ 1 (ca. 2950/2900-2775/2750 BC): This phase "marks the beginning of a new cultural process" (Lebeau 2011a: 367). In the eastern parts of the Jazira, Ninevite 5 ceramics dominate the recorded assemblages, while the GWJ (more precisely, the Wadi Hamar region) is further represented by reserved slip ware and cyma-recta bowls. Due to difficulties in establishing radiocarbon dates for its start and end, this phase could have lasted anywhere between 125 and 200 years.

EJZ 2 (ca. 2775/2750-2650/2625 BC) and **Final EJZ 2** (ca. 2650/2625-2575/2550 BC): This phase represents the peak of the Ninevite 5 culture in the eastern Jazira, and the initial commencement of the mid-3rd millennium urbanisation process across Northern Mesopotamia, producing cities with hierarchical systems and complex social structures by Final EJZ 2 (Lebeau 2011a: 369). In the GWJ, the ceramic assemblage is continuous, while at the same time seeing the introduction of an important new type: the noncalcareous metallic ware (see Sections 2.1.4.1, 2.1.4.3). Final EJZ 2 is defined by new ceramic typologies in the GWJ, with deep bowls, bevel-rimmed bowls, and the Jazira Bichrome Ware appearing, the latter solely in burial contexts. Additionally, it sees the first appearances of anthropomorphic clay figurines and administrative texts.

EJZ 3a (ca. 2575/2550-2435/2425 BC) and **EJZ 3b** (ca. 2435/2425-2340 BC): The EJZ 3 phase was defined as the peak period of urbanisation across the Jazira, with a dense patchwork of major centres ("cities"), "towns", "villages", and "hamlets". In terms of ceramics, EJZ 3 saw a general standardisation of forms and functional specialisation of vessel types. Ninevite 5 ware rapidly disappears during EJZ 3a in assemblages to the east, while the noncalcareous metallic ware dominates at sites in the GWJ. A large new repertoire of morphological types appear, including a variety of bowls, jars, and cups, however the GWJ remains very different from the eastern Jazira. The division of EJZ 3a from 3b is largely based on the prevalence of these types, which fluctuate significantly in prominence between the two sub-phases. In particular, the shift from rounded vessel bases to flat ones is diagnostically notable. Another mark of the latter sub-phase is the considerable decline of lithic assemblages.

EJZ 4a (ca. 2340-2275), **EJZ 4b** (ca. 2275-2200), and **EJZ 4c** (ca. 2200-2150/2110): The first two sub-phases of this phase correspond to the Akkadian period, with EJZ 4a defined as "Early Akkadian" and EJZ 4b as "Mature Akkadian", when the eastern Jazira was incorporated in its empire. Meanwhile EJZ 4c is definitively "post-Akkadian". EJZ 4 followed a period of hiatus at many sites. Though there is much continuity of ceramic morphologies from the previous phase, several significant changes did occur during EJZ 4, some possibly due to the Akkadian occupation. The most notable of these for the GWJ is the disappearance of the noncalcareous metallic ware from the material assemblage at the start of this phase. Furthermore, a new wave of standardisation created ware of higher quality with dense fabrics, such as combed wash ware. Though no definitive ware can be considered a marker for EJZ 4a, several new forms mark the arrival of EJZ 4b, including numerous beakers, bowls, jars, and pots, all with various incised decorations. EJZ 4c sees a widespread continuation of ceramic types, with new diagnostics appearing in the assemblages of only a handful of eastern Jazira sites. The GWJ, while occupied during this period, contains no EJZ 4c pottery.

EJZ 5 (ca. 2150/2110-2000 BC): This phase is poorly represented, with only a handful of sites, such as notably Mari, occupied while the GWJ appears to have become devoid of settlements. Ceramics feature a high percentage of vegetal tempering, with internal and external light- and/or self-slip. Morphological types from previous phases are still in use, but in rapid decline, while new diagnostics are represented by highly standardised forms. These include bowls, vats, jars, and stands, with mostly moulded decorations. Though "Khabur Ware" has been claimed to appear in EJZ 5 contexts, it in fact post-dates it.

2.3.4.2. EBA Periodisation in the Greater Western Jazira

The fieldwork projects discussed in this thesis use three different chronologies of differing precisions; one each for the three main areas of ground truth: the Balikh-Euphrates steppe, the Jebel Abd al-Aziz, and the Wadi Hamar. Some of these are precise chronologies that however differ from the ARCANE definitions, while others are broad descriptions that need to be correlated with the EJZ phases. The only project to directly make use of the "Early Jezirah" chronology is the excavation of Tell Mabtuh Sharqi; however its results have been too inadequately published as to make them useful for this study (see Section 2.1.3.4).

Broad frameworks

The *Westjazira* Survey uses the broadest categorisation of EBA material in the GWJ, assigning only one period ("*Frühbronzezeit*") to its entire duration (Einwag 1993: 34-37). Within this, the only precision that can be gleaned is from the identification of "Smeared Wash" ware, which dates to EJZ 3b, and the calcareous metallic ware ("stone ware"; *ibidem*: 34), which dates to EJZ 3b-5 (Lebeau 2011a: 268, 374; Pruß 2000: 194-197; see also Section 2.1.4.3).

Another vague periodisation is obtainable from the results of the TAVO Survey (see Section 2.1.4.1). As their data is limited to broad pottery identifications, very little precision can be gleaned. However, the analysis of Preuss (1989) clearly documents the sites at which metallic ware ("*Metallische Ware*") was found, though of which type cannot be said (see Section 2.1.4.3). The Sheikh Hamad Analyses on the other hand clearly distinguish the earlier noncalcareous ("*kalkarme*") and later calcareous ("*kalkreiche*") metallic ware.

"Frühjazira" *(EJ) chronology*

Frühgazira EJ chronology	Bderi phases	Bderi levels	Chuera phases	Brak phases	Leilan phases	Raqa'i levels	Southern Mesopotamia
EJ I	I	under 25			IIIa IIIb IIIc	5-7 4	ED I / II
EJ II	II	25-21	IB		IIId	3	ED II
EJ IIIa	IIIa	20-14	IC		IIa	2	ED II / IIIa
EJ IIIb	IIIb	13-6	ID	Late ED III	IIb		ED IIIb / early Akkadian
EJ IV (formerly EJ IIIc)			IE	Akkadian			Akkadian
EJ V (formerly EJ IV)				Ur III			Ur III

Table 2.6: The *Frühjazira* (EJ) chronology with the contemporaneous phases/levels of sites used to develop it (simplified from Dohmann-Pfälzner & Pfälzner 2001: Abb. 5; Pfälzner 1998: Abb. 1).

The Yale Khabur Survey was conducted at a time when attempts at regional chronologies in Northern Mesopotamia had begun to be made, but had not yet been finalised or attained a large scope. Thus the chronology employed was the best available from the closest well-studied area to the Jebel Abd al-Aziz; the *Frühjazira*, translated as Early Jazira (EJ), chronology created for the Khabur Valley area by Pfälzner (1997, 1998; Tab. 2.6). It must be emphasised that this is a forerunner, but not the same, as the similarly-termed EJZ chronology, which furthermore uses Arabic rather than Roman numerals to define its phases. Such a phenomenon illustrates one of the major obstacles to integrating survey data when the ceramic material found has not been published.

The EJ sequence was primarily developed based on the stratigraphic sequences of Tell Chuera and Tell Bderi (on the Khabur), the latter of which was excavated in 1985-1992 by the Freie Universität Berlin under the direction of Peter Pfälzner (1997: 240-241). It initially comprised four phases incorporating three sub-phases: EJ I, EJ II, EJ IIIa, EJ IIIb, EJ IIIc, and EJ IV. This sequence was subsequently modified on account of significant changes in ceramic material and settlement forms following EJ IIIb; thus EJ IIIc became EJ IV, and EJ IV became EJ V (Dohmann-Pfälzner & Pfälzner 2001: 105-110; Pfälzner 1998; Tab. 2.6)[55]. Of these, EJ II, III, and IV are described as the "urban" phases, while EJ I is considered proto-urban and EJ V sees the ending of the urban tradition (Pfälzner 1997: 241, 261).

Though this chronology covers the EBA in six phases, the Yale Khabur Survey does not provide this level of precision. Using the earliest version of the chronology (from Pfälzner 1997), it provides a periodisation of two phases only: one covering the EJ I-II, the other EJ IIIa-IIIb (see Section 2.1.4.5). The latter phase contained several sites that were deemed to have likely continued to be occupied during the "EJ IIIc" (really the EJ IV) based on circumstantial evidence of Akkadian occupation at Tell Chuera (Kouchoukos 1998: 373). However, no direct evidence for this was identified by the fieldwork conducted.

Tell Chuera (TCH) chronology

The only purpose-constructed chronology for a region entirely within the GWJ, the TCH sequence was developed based on excavations at Tells Chuera, Kharab Sayyar, and Tawila, and the Wadi Hamar Survey (Tab. 2.7). This sequence has undergone a number of changes since its development in the 1990s, a process discussed in Section 2.1.3.1. Its most recent incarnation divides the EBA into six phases incorporating two sub-phases: TCH IA, TCH IA/IB, TCH IB alt, TCH IB jung, TCH IC, TCH ID, TCH IE[56]. These are summarised in Table 2.1, and are also analogous with the definitions of the ARCANE EJZ

[55] Lebeau (2000) additionally introduced an EJ 0 phase preceding Pfälzner's chronology, contemporaneous with the Jemdet Nasr period of Southern Mesopotamia. However, this phase was not implemented by any projects in the GWJ until the development of the ARCANE EJZ chronology.

[56] It should be emphasised that TCH IA/IB is a separate phase as well defined as all others, and not an uncertain phase or a sub-phase of either TCH IA or TCH IB (Hempelmann, pers. comm. 22/11/2013).

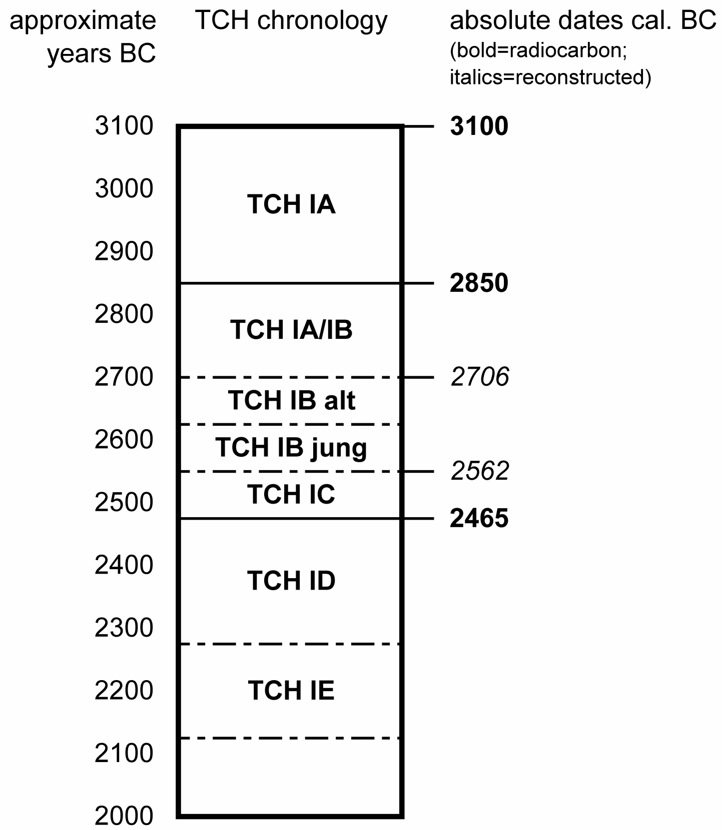


Table 2.7: TCH I relative and absolute chronology table (adapted from Hempelmann 2013: Tab. 12; Lebeau 2011a: Tab. 2 *Khuera*).

chronology described above. While TCH IA through ID are well defined, TCH IE is largely unknown, and is in some ways merely the label given to what comes after TCH ID and before the abandonment of the Wadi Hamar region (Meyer 2010a: 28; Pruß 2013: 139). Absolute radiocarbon dates have been used to pinpoint the starting dates of TCH IA, TCH IA/IB, and TCH ID (see Tab. 2.7). Furthermore, by calculating the average number of construction levels per phase from both Tell Chuera and Tell Kharab Sayyar, Hempelmann (2013: 161) has reconstructed approximate dates for the start of TCH IB alt and TCH IC.

2.3.4.3. Synthesis and Integration of EBA Chronologies

Selecting a chronology: "Early Jezirah" vs. "Early Middle Euphrates"

Choosing a single periodisation with which to analyse and compare all sites across the GWJ poses somewhat of a conundrum, as the region encompasses the areas of two major ceramic typologies, corresponding to two synthetic chronologies, both within the ARCANE project: the "Jezirah" and the "Middle Euphrates" (see Finkbeiner et al. [eds.] 2015; Lebeau & Sakal 2004-2014; Lebeau [ed.] 2011). While the former of these

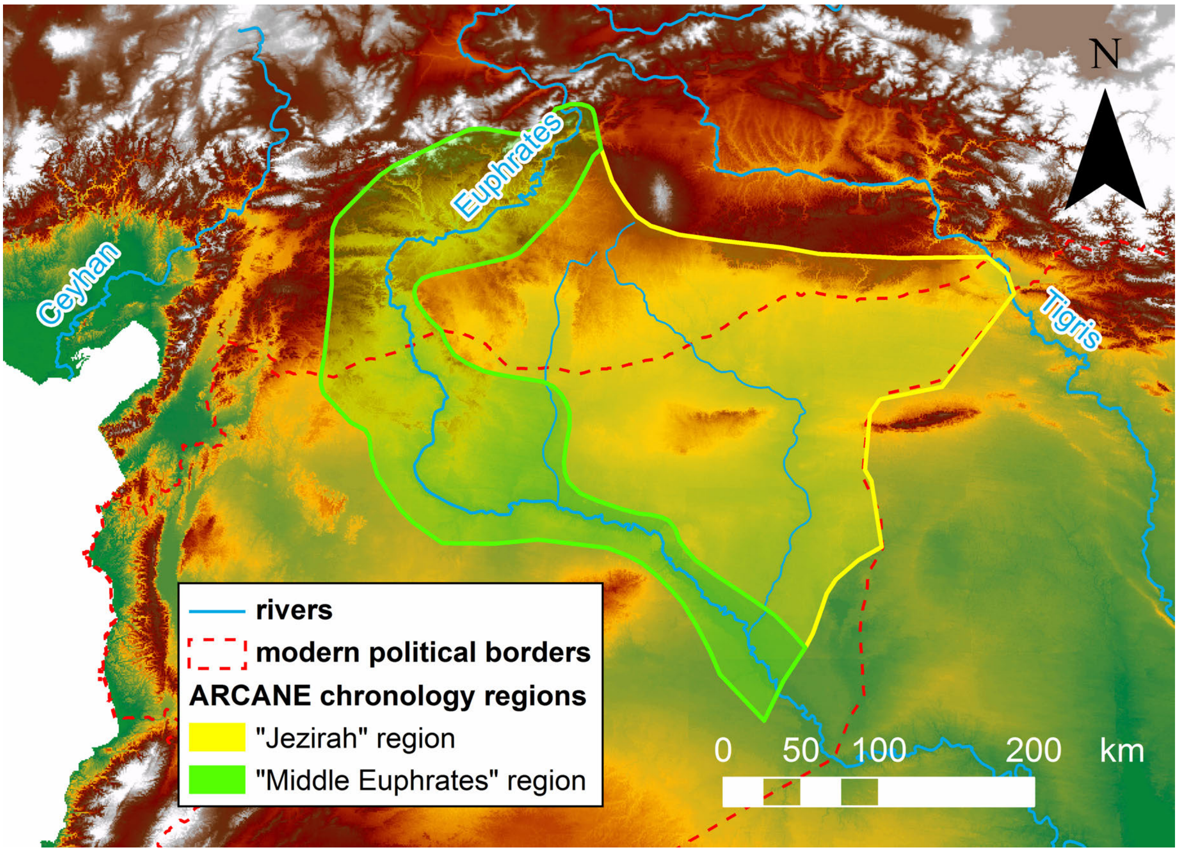


Figure 2.14: Map showing the regional divisions of the two ARCANE chronology areas pertinent to the GWJ (adapted from Lebeau & Sakal 2004-2014).

comprises nearly all of the Western Jazira (except perhaps its southernmost regions), the Euphrates-Balikh steppe falls squarely within the area of the latter (Fig. 2.14). Furthermore, it is known from Tell Chuera (see below; also Section 2.3.4.1) that the material of certain time periods at sites in the Western Jazira, while nominally within the EJZ region, can be closer connected to that of the "Early Middle Euphrates" (EME) typology, and potentially vice versa. There is no intrinsic reason for selecting one chronology over the other, as with six period divisions, the precision of the EME is equivalent to that of the EJZ, while its adherence to the same strictures of the ARCANE project also give it comparable accuracy. However, for this particular study, the EJZ chronology is the best-suited periodisation to use for one very simple reason: all analyses, surveys, and excavations carried out in the GWJ can be transposed to it fairly accurately (Tab. 2.8). The fact that this is easier to carry out for the EJZ than for the EME chronology is partially a result of the especially small number of projects in the "Middle Euphrates" region of the GWJ, but also the tendency of past investigations to look towards the well-documented material of the eastern Jazira to aid interpretations of findings in the steppe (see Section 2.3.4.2). Whether this produced the most accurate results is a matter of debate; however in the absence of the possibility of re-investigating the raw material gathered by these studies, as well as the lack of detailed publications of ceramic material (with the exception of Tell Chuera), the EJZ chronology is the only feasible periodisation for unifying, even in a broad sense, dating evidence across the entire GWJ.

Synthesising chronologies

years BC	ARCANE EJZ chronology	TAVO Survey	Sheikh Hamad Regional Analyses	*Westjazira* Survey	Yale Khabur Survey	TCH chronology
3000	**EJZ 0**			*Frühbronzezeit*		TCH IA
2900						
2800	**EJZ 1**				EJ I-II	
2700						TCH IA/IB
2600	**EJZ 2**	*"Metallische Ware"*	*kalkarme Metallische Ware*			TCH IB alt TCH IB jung
2500	**Final EJZ 2** **EJZ 3a**				EJ IIIa-IIIb	TCH IC
2400						
2300	**EJZ 3b** **EJZ 4a**			Smeared Wash & stone ware		TCH ID
2200	**EJZ 4b**		*kalkreiche Metallische Ware*			TCH IE
2100	**EJZ 4c**					
2000	**EJZ 5**					

Table 2.8: EBA chronological divisions used by projects in the GWJ (compiled from Einwag 1993; Hempelmann 2013; Kouchoukos 1998; Kühne & Schneider 1988; Lebeau 2011a; Meyer 2011; Preuss 1989; Schneider & Daszkiewicz 2001).

The easiest periodisation to convert is the TCH chronology, which not only is divided using typological and material ceramic definitions that mirror those used to divide the EJZ phases, but has also been already transposed in the ARCANE publication (Lebeau [ed.] 2011). However, the attempted integration of the two chronologies was not easy, it is admitted, as the earlier phases of Tell Chuera's occupation saw more in common with the material culture of the Middle Euphrates region than the rest of the Jazira (Quenet 2011: 22). Furthermore, the chronological phase transposing of Quenet (2011: 22-24; using dates from Lebeau 2011: Table 1) features several discrepancies with the absolute dating of TCH phases later provided by Hempelmann (2013: 157-161). Thus the starting dates of TCH IA/IB and TCH ID, which are displaced 100 years later and 30 years later, respectively, were adjusted to fit with their radiocarbon dates (marked by solid boundary lines in Tab. 2.8). Hempelmann's reconstructed starting dates of TCH IB alt and TCH IC also differ from their apparent dates in Quenet (2011: 22-24); however as these are expressly described as uncertain in the first place (Hempelmann 2013: 161), they were not adjusted.

The broad periodisations of the TAVO Survey, Sheikh Hamad Regional Analyses, and *Westjazira* Survey could also be transposed to the EJZ chronology without much difficulty.

As the presence of generic "metallic ware" is the only dating evidence available from the former survey, it could merely be said to apply to a period commencing in EJZ 2, when the earlier, noncalcareous type of this ceramic appears (Lebeau 2011a: 369). The Sheikh Hamad Analyses could be divided into two periods; the noncalcareous metallic ware indicating phases EJZ 2 to the end of EJZ 3b (see Section 2.3.4.1), and the calcareous variety of EJZ 3b to EJZ 5 and later (*ibidem*: 268, 374; Pruß 2000: 194-197). For the *Westjazira* survey, the only definite periodisation obtainable is the identification at many sites of generic EBA material. However, the specific mention of "Smeared Wash" ware and "Stone Ware" (which is analogous to the calcareous metallic ware), at certain sites creates an additional tentative phase precision starting in EJZ 3b (Lebeau 2011a: 373) and lasting to the end of the EBA (Pruß 2000: 194-197).

More convoluted was the process involved in converting the EJ chronology of Pfälzner to the EJZ chronology of ARCANE, as while a good estimate of absolute dates for the phases of the former based on the most recent discoveries is made by Lebeau (2011: Table 1), no transposing was done by the ARCANE team. This process was approached with a goal of creating a usable synthesis for this thesis, tailored to the specific project that utilised the older chronology; i.e. the Yale Khabur Survey. It is therefore not designed to be a correlation that can be used to transpose these sequences across the board, though many of the connections made here are no doubt transferrable. The terminology used for the EJ chronology here is from its earliest incarnation in Pfälzner (1997). Pfälzner's (1998; Dohmann-Pfälzner & Pfälzner 2001) later modifications were not considered here, as firstly they were not used by the Yale Khabur Survey, and secondly only had impact on the periods succeeding EJ IIIb, which were not recorded.

The survey makes particular note of the ceramic sequence of Tell Leilan as a close analogy to many of the wares identified at sites around the Jebel Abd al-Aziz, in particular those dating to the later period of EJ IIIa-IIIb (Kouchoukos 1998: 367-374). The Leilan sequence also happens to be one of the sites used by both Pfälzner and the ARCANE project to develop their respective chronologies. However, although the latter easily correlated the phases IIIa through IIId of the Leilan chronology (see Tab. 2.6) with EJZ 1 through Final EJZ 2, the later phases were only broadly matched (Quenet 2011: 35-36). Thus an examination of the sequences of two further sites integrated into both chronologies was made[57]. From the sequence of Tell Bderi, Levels 20-14 (equated with EJ IIIa; see Tab. 2.6) are matched with EJZ 3a by Quenet (2011: 37), while Levels 13-8 (EJ IIIb) are

[57] Pfälzner (1997, 1998) also matches the Tell Chuera chronology with the EJ, as does the ARCANE project with the EJZ. However, this was not used for transposing, as the TCH chronology has been substantially altered since the publication of the EJ sequence (see Section 2.1.3.1).

ascribed to EJZ 3b. Similarly, Raqa'i Level 2 (EJ IIIa) is matched with EJZ 3a also (*ibidem*: 32). Few sites' sequences are available for comparison for the later phases; Bderi Levels 7-6, ascribed to the end of EJ IIIb, are simply matched with EJZ 4, without determination of the precise sub-phase (*ibidem*: 37). However, the equating of EJ IIIc with the Akkadian period (Pfälzner 1997: 260), ascribed to EJZ 4a-b by Lebeau (2011a: 374), provides a good correlation. The description of EJZ 4c as "post-Akkadian" yet "pre-Ur III" places this phase between EJ IIIc and EJ IV, while the Ur III period itself is equated with both EJ IV (Tab. 2.6) and EJZ 5 (Lebeau 2011a: 377). Thus together a correlation between the two chronologies can be created, as presented in Table 2.9. From this, the Yale Khabur Survey could be divided into two phases according to the ARCANE chronology. The survey's earlier recorded phase thus corresponds to EJZ 1 to Final EJZ 2, and the later phase to EJZ 3a to EJZ 3b.

Frühgazira EJ chronology (1997 version)	ARCANE EJZ chronology
	EJZ 0
EJ I	EJZ 1
	EJZ 2
EJ II	Final EJZ 2
EJ IIIa	EJZ 3a
EJ IIIb	EJZ 3b
EJ IIIc	EJZ 4a
	EJZ 4b
	EJZ 4c
EJ IV	EJZ 5

Table 2.9: Table showing the result of transposing the EJ chronology of Pfälzner (1997) to the EJZ chronology of the ARCANE project (Lebeau [ed.] 2011).

2.3.5. Post-Early Bronze Age Periodisations

In general, little detail is entered into by the excavation and survey projects in dating periods following the EBA. The MBA is very poorly represented in the Western Jazira, with only two sites in the Wadi Hamar Survey documented, as containing generic "*Mittelbronzezeit*" occupation (Kudlek 2006). In the Euphrates-Balikh steppe, the *Westjazira* Survey mentions the existence of many sites from this period (though it only specifies two), but assigns them the same generic periodisation without subdivisions (Einwag 1993: 37). Late Bronze Age sites are mostly given an equally generic dating terminology ("Late Bronze Age" in Hole 1996; "*Spätbronzezeit*" in Kudlek 2006), with the notable exception of Tell Chuera. The TCH IIA and IIB phases at that site cover the Mitanni (ca. 1400-1300 BC) and Middle Assyrian (ca. 1250-1150 BC) periods, respectively (Meyer 2009: 56; 2010a: 14).

The Iron Age is fairly well represented across the GWJ, however it is not split into precise phases either, with the Wadi Hamar Survey simply assigning one generic period of "*Eisenzeit*" (Kudlek 2006). Slightly more detail is available for this phase in the description of Iron Age material at numerous sites as "Neo-Assyrian" by both the *Westjazira* and Yale Khabur Surveys (Einwag 1993: 38-41; 2000; Hole 1996). This would place occupation at such sites to the second half of the Early Iron Age, or the Iron IIA-IIB phases as defined by Stefania Mazzoni (2000); around 900-600 BC.

Later periods are covered even more broadly. Most of the projects used by this thesis simply divide the post-Iron Age eras into "Roman", "Byzantine", and "Early Islamic" periods, although the *Westjazira* Survey also uses the word "*Spätantike*" as a generic term for Hellenistic, Roman, and Byzantine periods (Einwag 1993: 39-42). The only instance of greater precision in the dating of these later periods comes from the excavations at the Islamic settlement of Kharab Sayyar, which date the site to the Abbasid period, or more specifically the 8th-11th centuries AD (Meyer *et al.* 2007).

Section 2.4: Conclusion

Though there remains a good deal of vagueness and gaps in much of the data collected above, their sum provides an unexpectedly large corpus of information about LC and EBA settlement in the GWJ on which to draw for this thesis. Indeed their coverage gives glimpses into the archaeology of much of the northern, eastern, and western sections of the geographical area, with only the south being completely devoid of previous investigation. In effect, the detail extracted from the numerous sources listed in this chapter enables the relatively accurate analysis of this region using remote sensing data alone. This is an unfortunate necessity due to the impossibility of conducting fieldwork within the borders of Syria at the time of writing, however as is described in Chapter 3, the volume of ground truth data available from past site visits, surveys, and excavations removes the bulk of the hindrance that such a restriction poses for this study. Developing a workable methodology to make the best possible use of this data, and structuring the process of gathering remote sensing data so as to complement it was the next crucial task carried out, before the gathering of the results detailed in Chapter 4 commenced.

Chapter 3
Methodology

Section 3.1: Introduction

The best possible method for achieving a total view of a landscape of the size of the Greater Western Jazira is by remote sensing methods. These not only make it feasible to study a large region within a reasonable timeframe and allow for the investigation of areas where ground visits are not possible (see below), but also provide a holistic overview within a manageable dataset, such that connections across time and space can readily be observed and analysed by the researcher. However, despite the great potential and widespread recent use of these methods, they are limited in the depth of the information they can possibly provide. In particular, a large amount of potentially accessible data is not visible at all, including structural developments within individual settlements, dating evidence, geomorphological and micromorphological data, and the majority of taphonomic processes. Thus it is important to note that remote sensing gives a complete overview of only a portion of any given landscape, past or present. Incorporating the crucial input of fieldwork with which to calibrate remote sensing results helps to mitigate these issues somewhat, and using a combined approach of full coverage of defined regions and detailed "ground truth" data has, for example, been used to great effect by the FCP (Galiatsatos *et al.* 2009; Lawrence *et al.* 2012; see also Wilkinson 2000a for an overview of the methodology). Fortuitously, such data exists in sufficient quantity and intensity for the GWJ, though it is admittedly somewhat sparse and largely focussed on purely archaeological settlement data, with fewer palaeobotanical or sedimentological investigations – though notable examples of such studies can be found for the Tell Chuera region (Fritzsch 2001; Krätschell 2011; Weicken & Wener 1995; see Section 2.1.4.7). The available data nevertheless renders a remote sensing-based investigation of the region both precise and accurate when considering broad settlement patterns as does the main remit of this thesis.

In a nutshell, the full-coverage datasets used chiefly comprise satellite imagery, primarily that of the declassified US military CORONA missions of the 1960s and 70s. These images were used to systematically survey the landscape of the GWJ, and cover every section of the region. Modern GeoEye imagery taken from 2008 onwards, accessed through GoogleEarth, was used to supplement this data where necessary. Meanwhile, digital elevation data from the Japan Aerospace Exploration Agency ASTER dataset was used to backup tentative feature identifications, lending or subtracting credence to or from these. Additionally, cartographical data was used in the form of both archaeological and explorers' maps to identify site toponyms for less well-known features.

Ground truth data of site visits, archaeological surveys, and excavations was gathered from published articles or volumes, unpublished reports, and raw data. Excavation results provided geographically limited, though extensive, details on individual sites, but were useful proxy data for the area as a whole. Results from ground surveys were in many ways the most essential data used by this research, enabling an archaeological picture of entire landscapes to be formed, while reports of site visits were used cautiously for locations at which no more systematic investigations had taken place. Put together, these were used both to inform the discoveries made by remote sensing, acting as refinement tools, and to enable the extrapolation of links made with remote sensing to regions where no ground observation exists, a process is explained in detail in Section 3.4.

Amongst the abovementioned benefits provided by remote sensing data, its ability to allow the study of regions not available for fieldwork is particularly resonant in this case. At the time of writing, the war in Syria, raging since 2011, shows no sign of abating at any time in the near future. Like so many archaeological projects, this research had to forego its planned fieldwork. Though a full-scale survey would have been impractical due to the great size of the study area, it was my initial intention to conduct ground visits to sites of seeming significance based on remote sensing identifications. In lieu of such a component to this investigation, redoubled efforts were made to obtain ground truth data from previous visits to the GWJ. These were slowly obtained from disparate sources of limited accessibility, including rare copies of travellers' reports from the early 20th century, unpublished theses, and a plethora of personal communications from direct contact with members of various field teams (see Section 3.3). These supplemented the previously-identified main sources to such an extent that the effect of the absence of first-hand data was rendered minimal. It is to be hoped, however, that such data may still be obtained at a later date, and used in conjunction with this research to provide a more precise assessment of the GWJ.

Section 3.2: Background History

3.2.1. First Forays

The benefit of remote sensing data, in its most basic form, has been apparent to the archaeological world for some time. Not long after the advent of aerial photography during the First World War was it first used to map known archaeological sites, providing precise information on their extent, form, and composition (Bewley 2005: 16-17). Furthermore, the Near East, and the Syro-Levantine region in particular, was one of the first regions where such aerial mapping was used extensively, due to a combination of imperial interests by Britain, France, and Germany, and the ease of site identification in a flat, arid landscape. Following the activities of the German *Denkmalschutzkommando* based in Palestine during World War One, Antoine Poidebard began to use aerial photography in Syria and Transjordan in the 1920s and 30s for purposes more akin to archaeological survey; that is, to detect potential new sites rather than simply map known ones (*ibidem*; see Section 2.1.2.2). Such activities continued in the following decades, culminating (from an archaeological perspective) in the pioneering interpretations of van Liere and Lauffray (1955; see Section 2.1.2.4).

3.2.2. The Application of GIS

Modern GIS methods have, since the 1990s, been used to map settlement patterns across the landscape of the Syrian steppe, and the Jazira region in particular. This burgeoning practice was given a major boost in 1995, when the high-resolution satellite imagery known as CORONA, taken by the US government in the 1960s and 70s, was declassified, and slowly made available to the public at an affordable price. In 1997, Tony Mathys, then of Ohio University, presented a paper at the University of Chicago's Oriental Institute on "the use of declassified intelligence satellite photographs … to map archaeological sites and the surrounding landscape in the northeastern region of the Syrian Jazirah" (Mathys 1997, cited in 2001: 37). While Mathys (2001: 24) subsequently used digitised geospatial information and computer graphics to map site locations, analysing their geographic relations in his M.A. thesis, he did this using maps, traveller's accounts, and survey reports rather than satellite imagery. Although he concedes that the latter "would serve as a practical application for mapping archaeological sites", Mathys (2001: 37) eschews it due to the prohibitive costs involved, considering the scanning in of negatives and georectification required. In subsequent years however, such expenses diminished, with the number of pre-scanned negatives increasing and the process of georectification becoming much simpler to conduct, to the point where a vast library of several hundred thousand images is available for online ordering and download from the website of the United States Geological Survey (USGS; Ur 2003: 105). As a result, the application of such practices increased exponentially, leading to widespread and detailed studies being conducted up to the present day.

3.2.3. Integration of Satellite Imagery

Following this initial foray into GIS applications, the value of incorporation of declassified satellite imagery was demonstrated by Nicholas Kouchoukos, starting with his 1998 Ph.D. thesis. Kouchoukos (1998: Fig. 7.3, Fig. 7.14) used satellite-derived data to determine modern land use in the Jebel Abd al-Aziz region, and further employed Landsat, SPOT, and IRS imagery to illustrate vegetation around those mountains' foothills. However, it was in a 2001 article that Kouchoukos introduced the element of human-landscape interaction to satellite-image study, in work that builds upon the aerial surveys of Poidebard and van Liere and Lauffray, bringing the latter back into academic discourse by updating its applications with modern techniques. Using mainly IKONOS imagery, Kouchoukos (2001: 84-85) describes their usefulness for various purposes, one being the analysis of human interactions with the surrounding landscape, determining long-term effects of practices such as irrigation and soil degradation. These, he states, are processes that are hard to see using traditional archaeological methods due to the short and sporadic nature of fieldwork seasons, while satellite imagery from a variety of time periods from the 1960s to the present "fills this blind spot".

Further, Kouchoukos (2001: 87) recognises satellite images' usefulness in the identification of sites and off-site features across a wide landscape (especially in the mostly-cloudless Near East), as well as the determining of individual sites' forms and landscape relations. For the latter, he uses an example of a two-tiered fortified settlement in the GWJ – Tell Mabtuh Gharbi. For this site, Kouchoukos (2001: 89) notes not only that its double-walled structure is shown much clearer on satellite imagery than in either Poidebard's or van Liere and Lauffray's aerial surveys, but also that individual stone and mudbrick houses are visible on its surface. Additionally, he briefly mentions the ability to recognise ancient routes known as "hollow ways", something which Jason Ur (2003) would subsequently use to great effect in the eastern Jazira, as described in detail below. While the majority of Kouchoukos' article deals with IKONOS imagery, CORONA is mentioned briefly in relation to its usefulness for detecting ancient features which, through human development, have become obscured in the intervening years since the 1960s/70s.

Kouchoukos (2001: 82) notes that due to "the rapid pace of agricultural development throughout the Near East over the past twenty-five to thirty years, CORONA images are becoming important tools for landscape archaeology". This statement is indeed prescient, as agricultural, as well as urban, development has only increased in the years since the article was published, and with that, the importance of historical records of landscapes and ancient features has equally increased.

The incorporation of satellite imagery for site detection and distribution plotting was subsequently demonstrated by the "Settlement and Landscape Development in the Homs Region, Syria" project, which identified both tell sites and flat artefact concentrations using CORONA imagery, verifying these by field visits to confirm their validity (Philip *et al.* 2002: 112-113). Such an application, it is emphasised, was only made possible due to the high levels of resolution of CORONA, as earlier satellite imagery such as Landsat and SPOT was mostly only effective for mapping landscapes and identifying large-scale intersite features (*ibidem*: 109). However, the use of CORONAs for the latter is also demonstrated, with the mapping of stone walls demarcating ancient field systems highlighted as intersite features that lie beyond the resolution of Landsat. Additionally, features within individual fields, such as animal enclosures, could be identified and measured using CORONA imagery alone (*ibidem*: 113-115).

Thus aerial and satellite imagery of large-scale landscapes is not only useful for determining individual features or their distributions, but also the connections between them. These can be abstract, but also concrete, in the form of routeways connecting sites both with their agricultural and pastoral hinterlands as well as with other settlements. These are characterised by modern imprints on the physical landscape known as "hollow ways", first mapped in the greater Jazira region as "*routes rayonnantes*" by van Liere and Lauffray (1955), and brought into a modern archaeological context by Tony Wilkinson (1993). As mentioned in Section 2.1.2.4, these features are depressions in the landscape caused by the use and re-use, over centuries, if not millennia, of defined routes across the landscape. Such pathways emanate from many EBA sites in Northern Mesopotamia, and while they occasionally connect to other settlements, they were used far more frequently by a single settlement to access the landscapes of agriculture and livestock pasture that surrounded it (*ibidem*: 560-561). While the largest of these "hollow ways" are sometimes visible on the ground, they are mostly impossible to see, let alone trace across a larger landscape (Ur 2003: 102-103). Thus satellite imagery has come to be the predominant method for mapping these features, first employed in the form of Landsat images in the early 1990s (Wilkinson & Tucker 1995: 16-17). By using the higher-resolution CORONA together with GIS programs, Jason Ur has mapped over 1700km of ancient roads in the Khabur river basin, tracing their routes across a vast landscape of nearly 20,000 km^2 (Ur 2003: 107).

Satellite imagery, and specifically CORONA, has therefore seen expanded use in an archaeological context over the last 20 years, its high resolution allowing for locating and determining the nature of a wide variety of ancient features. The use of these images can, at their best, aid fieldwork, especially survey, to such an extent as to make measurements on the ground unnecessary. A recent example of this can be found in the methodology of the Erbil Plains Archaeological Survey (EPAS; Fig. 1.3) in Kurdistan, Iraq, which is heavily reliant on CORONA imagery remote sensing (Ur *et al.* 2013: 94-95). Prior to fieldwork commencing, the project compiled a database of settlements and other potential ancient features identified subjectively on satellite imagery. Using this, the team was able to significantly speed up its fieldwork process; not simply searching the entire landscape for features, but specifically targeting tentative identifications from remote sensing, confirming or denying their existence and categorising them into site types and periods (*ibidem*). Thus the integration of satellite imagery with ground truth investigations has become standard practice, and a clear model for future such projects to follow.

3.2.4. Uses of Digital Elevation Models

Beginning in the early 2000s, global digital elevation models (DEMs) became freely accessible to the public, starting with the Shuttle Radar Topography Mission (SRTM) carried out by NASA’s Space Shuttle Endeavour in February 2000. This elevation data, taken across the world at a resolution of 90 metres (30 metres within the United States), was made available to download from the USGS website in 2004, and its use to archaeology was quickly recognised (Sherratt 2004). By 2009, another DEM dataset had become freely available online, the Japanese Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER), launched on a NASA satellite (Terra) in 1999 (Abrams 2000: 847-848). This model, updated in October 2011 to an improved “version 2”, shows elevation at a resolution of 15 meters, six times that of extra-US SRTM data (*ibidem*: 854-858). Specifically, DEMs are very good at showing mounded sites such as tells in flat landscapes, making them ideal for the steppe plains of the Jazira (Menze *et al.* 2005). As such, they have become useful to complement both ground truth data and satellite imagery.

Moving beyond mere supplementary data, DEMs have also been implemented into automated algorithms to detect tell sites in the Near East. In particular, Bjoern Menze, Jason Ur, and Andrew Sherratt (2005, 2006), using the Khabur river basin (Fig. 1.1) as a case study, have demonstrated a successful implementation of such a system. Using manual detection of sites on CORONA imagery as a control, this process automatedly detected 64% of all tell sites over a height of 5-6 metres using SRTM, with a reasonable number of false positives (due to natural elevations) that could be manually removed from the dataset with relative ease (Menze *et al.* 2005). In subsequent publications, the authors explain their use of SRTM over ASTER data. Despite the latter revealing “unique details” in areas with high gradients, including large tell sites, the existence of numerous digital artefacts in flat regions (such as the Jazira plains) that appear very similar to the signature of tells rendered the DEM unusable for an automated algorithm (Menze *et al.* 2006: 322). Another study by Mark Altaweel (2005) in northern Iraq found that ASTER data was of greatest use for confirming the existence of features identified on CORONA imagery, as well as for separating different site types’ distinctive signatures. However, it worked best in regions whose archaeology was already to some extent known from other sources, and could not be used to detect small sites (*ibidem*: 162).

3.2.5. Maps

For regions inaccessible on the ground, maps created by past travellers, along with their accounts, provide a further useful source of data. These can be used not only to determine the locations of features, but also identify toponyms (Mathys 2001: 34-35). The French Levant map series from the 1930s and 40s, along with the US Defense Agency’s Gazetteer for Syria, were used by Mathys (2001: 35) to identify the locations and names of various potential sites across the Jazira, which he digitised into a GIS database. Kouchoukos (1998: 348; 2001: 80) meanwhile praises the usefulness of Richard Kiepert’s *Karte von Kleinasien*, based in part upon von Oppenheim’s travel reports (see Section 3.3.2.1). However, the exact locations of features can be very difficult to determine from such early maps due to inaccurate traveller’s reports and imprecise mapping methods. Thus they are most useful for determining toponyms for already located features, which in turn can be used to compare with archaeological and traveller’s reports, many of which do not include maps.

Section 3.3: Data Sources and their Provenances: An Evaluation

3.3.1. Remote Sensing Data

3.3.1.1. CORONA

CORONA satellite imagery is the primary source of remote sensing data for this thesis' research. This was a choice based mainly on the prominence of ancient sites on the images, their large area coverage, and the snapshot of a largely pre-urbanised landscape. The ease and accuracy of recognising LC and EBA settlements, particularly mounded sites, using CORONAs is the result of a combination of their high resolution and the clarity of human landscape disturbance that they portray. The latter arises from differing light reflectance levels between disturbed and undisturbed soil. Though in general surface reflectance is high and contrast low across the flat terrain of the Jazira plains, creating a fairly homogenous appearance (Kouchoukos 2001: 87), settlements, especially those of the 3rd millennium BC, are very prominent. This is partially due to their topographical eminence (creating aerially visible shadows during most times of day), but also the differential drying of mud-brick walls and room fill or surroundings, which results in high reflectance of the visible light spectrum. Increased vegetation on soils with higher moisture capacities can create an additional clear visible signature on CORONAs (*ibidem*: 88-89).

Another factor that determined CORONA as the primary remote sensing dataset to be used was its ease of availability. A large number of imagesets had already been downloaded from the USGS website by Durham University's Fragile Crescent Project, and georeferenced and rectified by Niko Galiatsatos, before this research began. Additional imagery was downloaded by members of the FCP, including myself, from the University of Arkansas' CORONA Atlas of the Middle East, which provides pre-georeferenced imagery.

Several CORONA imagery missions were used to conduct the research for this thesis, and an attempt was always made to have more than one mission's images available for any given region. The primary imageset came from Mission 1038-2, flown on 22 January 1967. Frames 61 through 74 from the forward camera of this mission were available from the outset of this project, having already been obtained and georectified by members of the FCP. These provide good coverage of the majority of the GWJ, from its northern edge to 70km north of the confluence of the Euphrates and Khabur rivers, which includes the entirety of the Balikh-Euphrates steppe (Fig. 3.1). Areas not covered are the southern portion of the region, as well as its eastern extremities, as the imagery comes within 10-

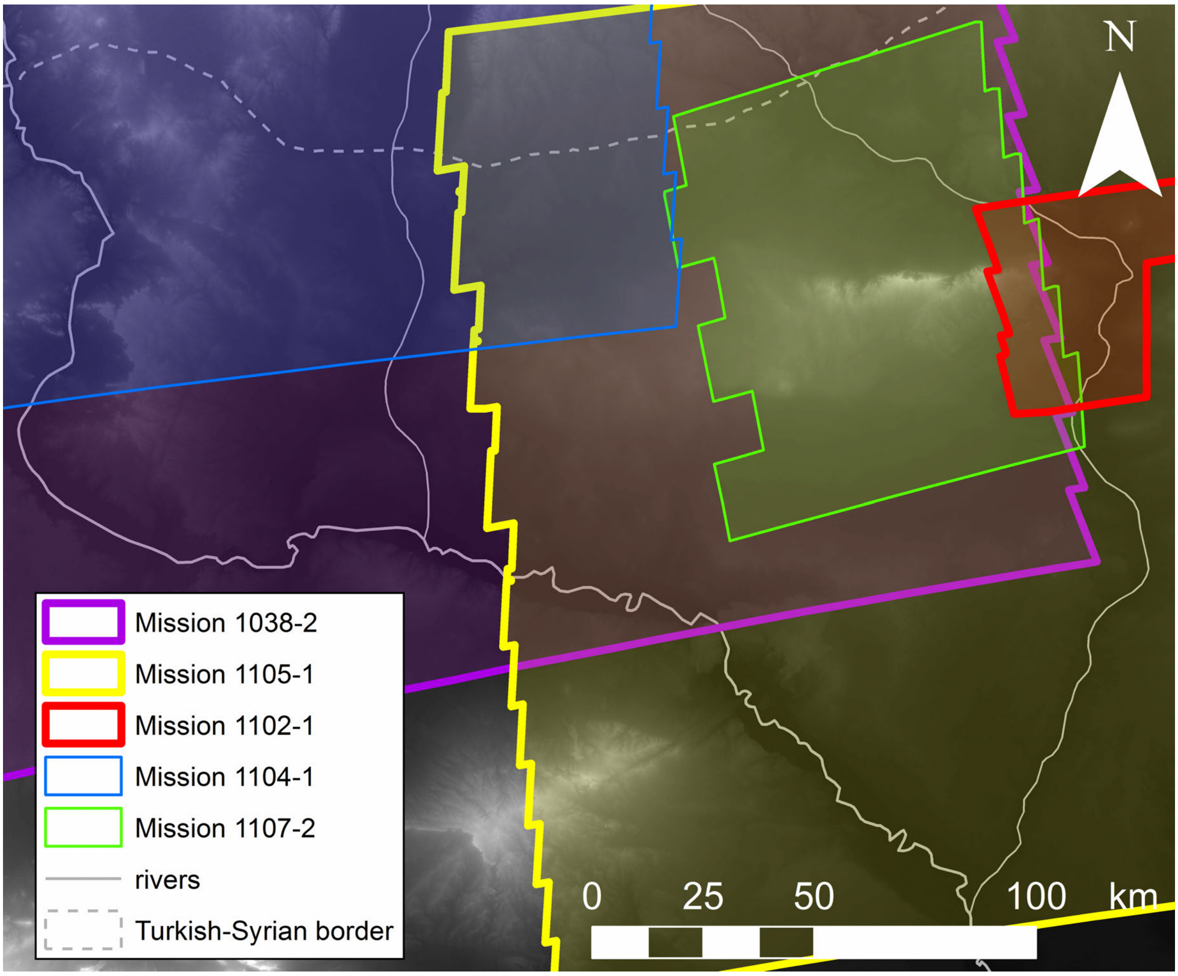


Figure 3.1: Map showing the coverage of the three primary and two backup CORONA missions used.

20km of the Khabur. The images' January date, thus taken at a time of year when less dust and sand is in the atmosphere, also contributes to their usefulness for archaeological survey (Donoghue *et al.* 2002: 217-218). This is especially true of the northern Western Jazira, where it provides the clearest imagery out of the datasets used (Fig. 3.2). Additionally, Mission 1038-2 was found to be the most accurate CORONA imageset in terms of location, as determined by comparisons with GeoEye imagery and GPS points taken on the ground. By contrast, in the extremely arid south of the region, where soil moisture retention variations are the best method of determining sites by photographic remote sensing, possible features are not clearly defined on images from this mission, with the landscape appearing overly homogenous (Fig. 3.3).

The second main CORONA imageset used comprises frames 50 through 77 from the forward camera of Mission 1105-1, flown on 5 November 1968. These were downloaded from the University of Arkansas' "CORONA Atlas of the Middle East"[58], which provides

[58] http://corona.cast.uark.edu

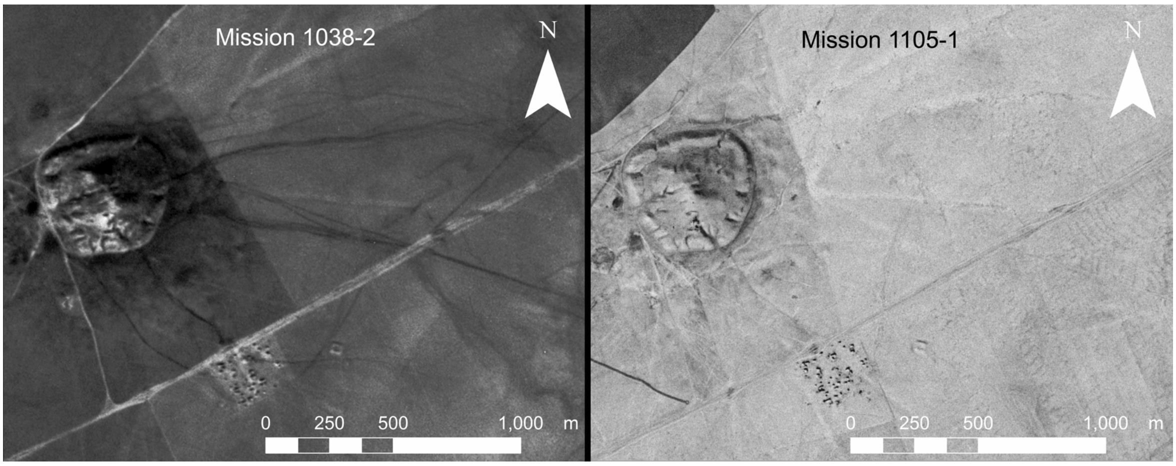


Figure 3.2: Comparison of a section of CORONA Missions 1038-2 and 1105-1 from the northeastern Western Jazira showing the superiority of the former imageset; while large sites are fairly clearly visible on both, offsite features are practically invisible on the right-hand imagery.

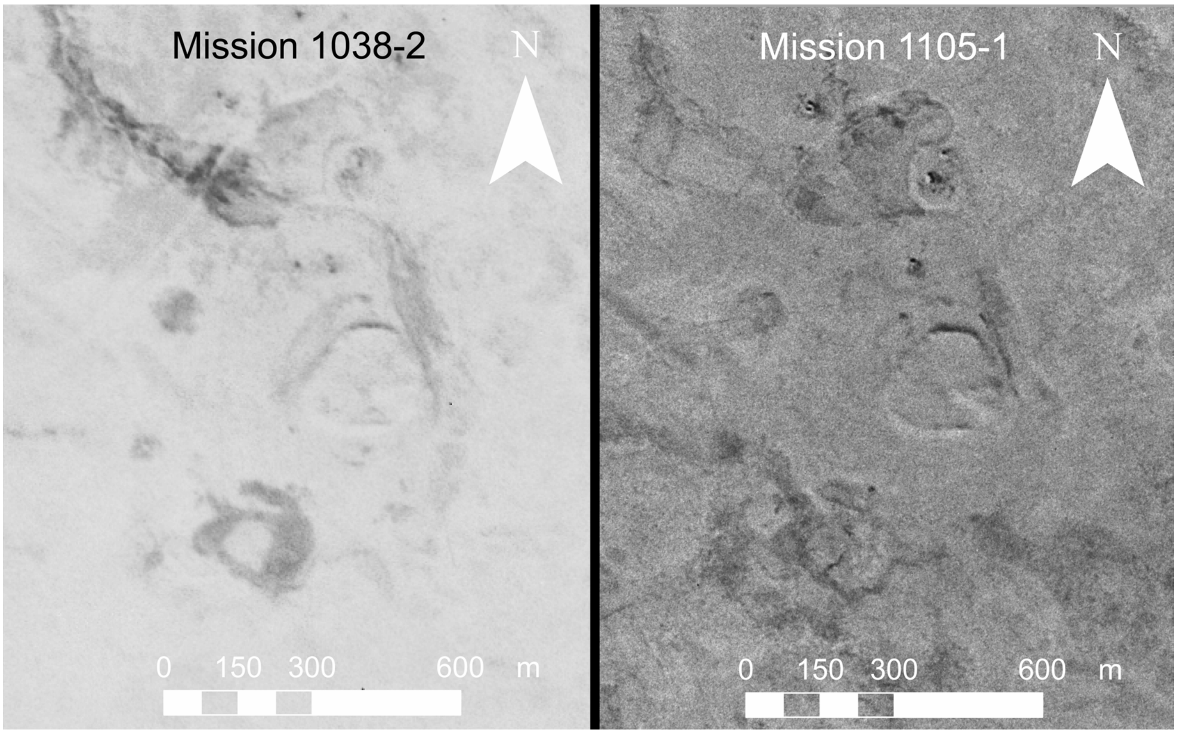


Figure 3.3: Comparison of a section of CORONA Missions 1038-2 and 1105-1 from the southeastern Western Jazira showing the superiority of the latter imageset; especially for the clarity of features within the site shown.

pre-georectified imagery for free download[59]. This served as both a backup for areas covered by 1038-2 and the primary imagery for the southern portion of the Western Jazira, as it covers the entire north-south extent of the region from the Khabur to within 15km east of the Balikh (Fig. 3.1). The images from this mission are in fact better for the dry areas south of the 200mm isohyet (see Fig. 1.6), as they provide a greater contrast and thus show sites absent from Mission 1038-1 (Fig. 3.3); most likely due to the earlier (drier) time of

[59] Some inaccurate georeferencing issues exist with imagery from the CORONA Atlas of the Middle East; these were dealt with as described in Section 3.4.3.1.

year being better for showing up the differential drying effects of archaeological features (see Ur 2003: 103; Beck *et al.* 2007: 170). The only downside to this imageset is the more visible film grain it displays when compared to the former mission, which effectively results in a lower image resolution. Nevertheless, the vast majority of known sites are visible; a good indication that the imagery is well suited to the identification of new sites.

The final primary imageset is Mission 1102-1, from which frames 14 to 16 of the aft camera had been previously acquired by members of the FCP, but not orthorectified. These I georeferenced using distinctive islands and bends in the flow of the Khabur river as ground control points against Landsat imagery, which itself had been previously georeferenced by members of the FCP. These images, from 11 December 1967, cover the very eastern edge of the Western Jazira, penetrating the region by a mere 30km from the Khabur in the vicinity of the modern town of Hassaka (Fig. 3.1). This is precisely the region not covered by the primary imageset from Mission 1038-2, and as it is largely analogous in image quality and landscape contrast, it complements this well. Thus this mission was used in conjunction with the aforementioned one, and treated together as one imageset.

Imagery from two further CORONA missions was used to conduct this research, both as backup. Mission 1104-1 (frames 11 to 17 from the aft camera), which had already been acquired and georectified by the FCP, covers the northern half of the Balikh-Euphrates steppe as well as the northwestern corner of the Western Jazira (Fig. 3.1). However, this imagery was taken on the 8 August 1968, and displays many of the downsides of photographs taken during the dry summer. While it was nevertheless attempted to use this imagery as backup, the homogenous-looking landscape on it made identification of known sites difficult, let alone the discovery of new ones. The final imageset used was Mission 1107-2 (frames 69d through 74d from the aft camera), which covers the northeastern quadrant of the Western Jazira (Fig. 3.1). Previously acquired by the FCP, but georectified by me, this imagery provides good backup for roughly a quarter of the main region covered. Taken on the 1 August 1969, its contrast is not ideal, but much superior to that of Mission 1104-1; indeed it provides atypical clarity of geographical features for summer imagery. The main downside of this mission is its poor resolution, with an abundance of film grain that makes site detection somewhat hard. However, it was still possible to workably utilise this imageset.

3.3.1.2. GoogleEarth (GeoEye)

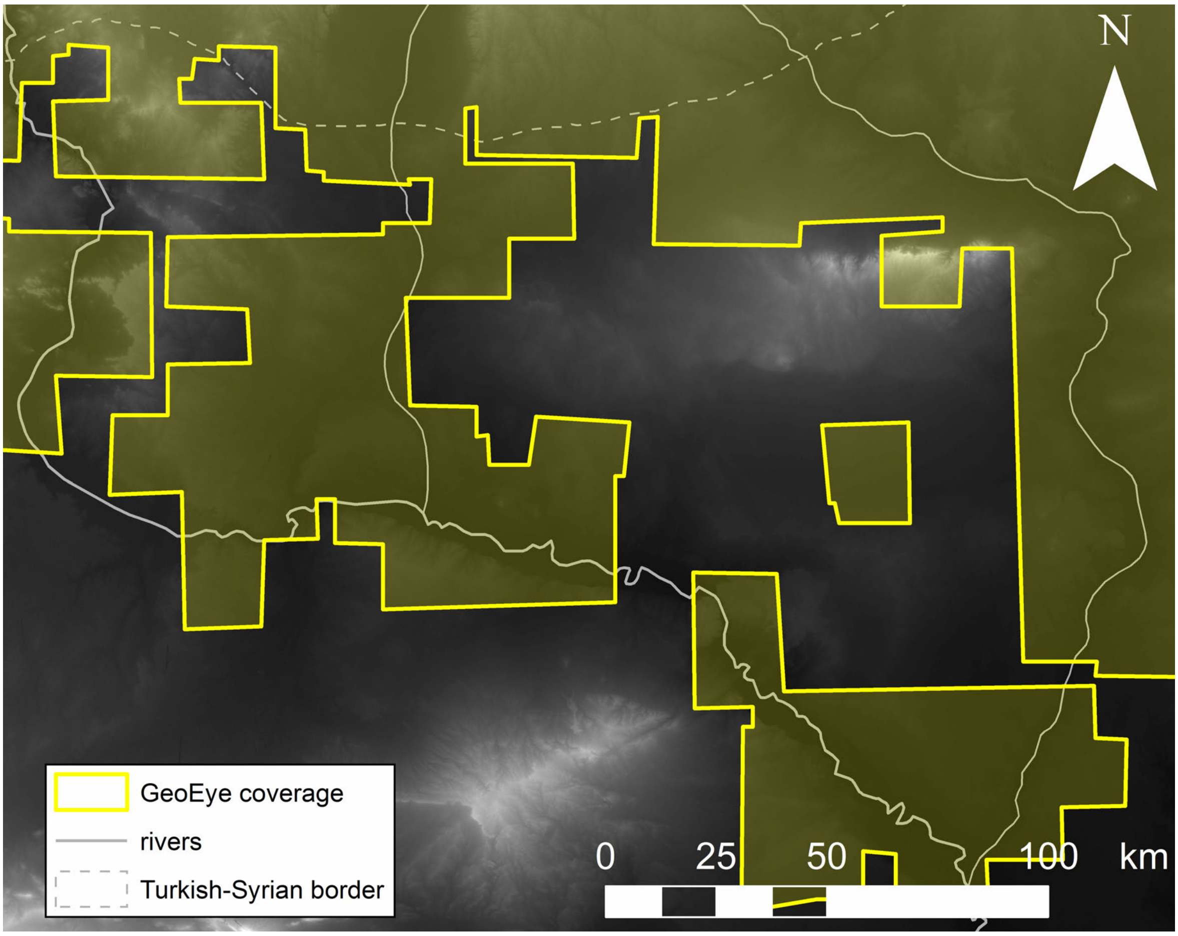


Figure 3.4: Map showing the current coverage of GeoEye imagery in the GWJ.

To complement the primary CORONA imagesets, modern satellite imagery acquired through GoogleEarth was used. The purpose of this was mostly as a backup for feature identifications that were particularly uncertain, or for which there were no suitable CORONA images. Sometimes, however, the recent date of the imagery was an integral part of the reasons for their use, for example in the identification of the extent of unpublished excavations at Tell Mabtuh Sharqi (see Section 2.1.3.4). The GoogleEarth viewer comprises a variety of imagesets from different sources, many of which are inferior in resolution to CORONA. However, images taken with the GeoEye-1 satellite, launched in 2008, provide high resolutions of up to 50cm. At the time of writing, GeoEye[60] coverage extends over large sections of the GWJ and has been constantly expanding during the course of this research (Fig. 3.4). In particular, most of the Balikh-Euphrates steppe, as well as a significant portion of the northwestern and northeastern corners of the Western Jazira, are covered. In the latter region, this imagery is also available for the southernmost areas. This means that many of the large “Kranzhügel” type settlements and their environs

[60] © 2014 DigitalGlobe

are covered by this high-resolution imagery, including Tells Chuera, Abu Shakhat, Khanzir, and Mabtuh Sharqi.

3.3.1.3. DEMs

Of the two digital elevation model datasets freely available, it is ASTER that was used to complement the satellite imagery for site identification. The increased resolution of this model over that of the earlier SRTM proved to be a major factor in this decision, as a large number of known sites in the region, examined on both DEMs, were definitively clearer on ASTER data. Meanwhile, many of the issues with digital artefacts in ASTER, which render it less useful than SRTM for automated algorithms (Menze *et al.* 2006), do not pose a problem for manual site identification as carried out for this project (see Section 3.4.3.2). A total of six tiles of elevation data were downloaded for this project from the Japan Space Systems website[61], covering the latitudes 35 to 36 degrees north and the longitudes 38 to 40 degrees east. This encompasses the entirety of the GWJ, as well as much of the landscape across the Euphrates and Khabur, and north of the Turkish border.

3.3.2. Cartographical Data

3.3.2.1. Early Travellers' Maps

Starting in the late 19th century, German explorers first began to travel across Mesopotamian regions away from the river valleys that earlier travellers had followed, noting geographical, archaeological, and anthropological points of interest along their ways. These were followed by travellers from other countries, and by the time of the First World War, a good deal of the Northern Mesopotamian landscape had been mapped, not least due to preparations for the impending conflicts. These maps are certainly not complete, including only features from areas that happened to be on the travellers' routes, and are very often inaccurate in terms of geography. However, when correlated with modern remote sensing data, they provide excellent additional information in the form of site toponyms, which, in turn, allow the comparison of sites identified by modern methods with possible mentions in past reports.

In 1899, von Oppenheim began his second journey through Mesopotamia; the first that traversed a large portion of the GWJ. This crossed the northern Balikh-Euphrates steppe and the area from the Wadi Hamar to Ras al-Ain on the Khabur (Fig. 1.1), where von

[61] http://gdem.ersdac.jspacesystems.or.jp

Oppenheim conducted the first preliminary excavations at Tell Halaf. Subsequently, the region between that site and the Jebel Abd al-Aziz, including the mountain itself, was explored (von Oppenheim 1901: 86-87, 91-92). The published maps of these journeys (von Oppenheim 1911: Tafel 11, Tafel 18, Tafel 23) are fairly geographically precise, and show both sites encountered by von Oppenheim and ones based on word-of-mouth information from locals and other European travellers. These maps are the first to include several of the major sites across the northern Western Jazira and the Jebel Abd al-Aziz foothills, such as Tells Abu Shakhat, Dakhliz, Khanzir, and Mabtuh Gharbi (called “Munbateh” here). Additionally, a number of further features located between these two areas are marked and named, as well as several in the Balikh-Euphrates steppe.

The most detailed and complete of all travellers’ maps available for use in this study was Richart Kiepert’s *Karte von Kleinasien*, first published 1902-1906, with a second edition a decade later. This map series is made up of 24 individual sheets, together encompassing the entirety of modern-day Turkey and the northern half of Syria. The relevant two sheets for northeastern Syria cover the entire Balikh-Euphrates steppe (Kiepert 1910/1915a) and the majority of the Western Jazira, with the exception of its southeastern extremities (Kiepert 1910/1915b). The contents of these are compiled from a wide range of previous maps and travel reports, whose routes are also indicated. Thus this provides a holistic view of discoveries in the GWJ before the First World War, and an invaluable resource to site confirmation and toponym identification. Very usefully, it includes a variety of possible transliterations for many toponyms, depending upon the methods of the travellers involved, and also cites Arabic, Turkish, and/or Kurdish language names for each feature where applicable.

Kiepert’s (1910/1915b) map of the Western Jazira is the first to include not only specific known sites, but also entire areas of archaeological significance that had hitherto remained undocumented. Thus around a dozen tells located between Tell Khanzir and the Jebel Abd al-Aziz are marked, as well as a variety of sites south of the latter. Further west, several tells within 20km of the Balikh valley are marked and named (Kiepert 1910/1915a). These identifications are especially useful, as they fall within areas that have not been the subject of archaeological surveys. For the Balikh-Euphrates steppe region, the map includes a handful of sites south of von Oppenheim’s 1899 route across the north of this landscape along which a multitude of features are marked. Interestingly, the map also states that, according to von Oppenheim, 40-50 ancient sites are located in this region south of the 36.5th latitude. This comment, to which I could not find any reference in any of von Oppenheim’s works, though useless for pinpointing site locations, helps to verify the existence of a myriad of archaeological features in this region, as indeed were identified by my research.

The most recent traveller's map available[62] was that of Alois Musil of Charles University, Prague, who between 1908 and 1915 travelled extensively throughout the Near East, including much of modern-day Syria (Musil 1927: xiii-xv). In 1912, Musil undertook a journey which included a section from al-Su'ar on the Khabur westwards across the lower portion of the Western Jazira to Raqqa (see Fig. 1.1). This traversed some hitherto unexplored regions, including the vicinities of the major sites of Khirbet Malhat and Tell Zahamak, which are marked on the map accompanying Musil's published volume. Of greater use to this research, however, is the detailed inclusion of a large number of wells in the southeastern extremity of the Western Jazira – a region largely unexplored even to the present day. Roughly 30 wells are marked south of Khirbet Malhat, confirming this to be a region that, while arid, has, at least in modern times, a high enough water table to allow relatively frequent water access (*ibidem*: "Southern Mesopotamia" map; see Section 1.2.2.3). This provides extremely interesting proxy data for the possibilities of ancient human occupation.

3.3.2.2. Archaeological Maps

Maps produced for publications attained an archaeological focus as such investigations began to occur in the GWJ. The first such work is the map included in Anton Moortgat's second publication on Tell Chuera and its environs (Moortgat 1959). Despite a large scope and improved accuracy over previous efforts, this map suffers from poor precision of both site locations and names. It also omits several sites that were already known at the time such as Khirbet Malhat. Thus it is Ursula Moortgat-Correns' maps from her seminal 1972 volume which provide the best archaeological overview of the Western Jazira region (Moortgat-Correns 1972: Karte II, Karte III). The contents of these are compiled from the maps, written publications, and personal travel diaries of von Oppenheim, Poidebard, van Liere and Lauffray, Moortgat, and Seton Lloyd (*ibidem*: Karte II *verso*). Including accurate and precise locations and names of nearly all the two-tiered fortified settlements in the Western Jazira, as well as several sites of other varieties, this map provides an excellent overview of the Wadi Hamar and Jebel Abd al-Aziz areas. It is less useful for other parts of the region; though it includes Khirbet Malhat, Tell Zahamak (here labelled "Tell Ezhamak") is misplaced, an error repeated on many later maps (see e.g. Meyer 2010a:

[62] One later yet traveller's map, that from von Oppenheim's (1943) volume combining all his journeys in Upper Mesopotamia, was unfortunately unavailable despite my best efforts to procure a copy.

Abb. 2). It also seems not to include more tentative identifications of earlier maps, with many of the tells marked on the *Karte von Kleinasien* absent. The same goes for the Balikh-Euphrates steppe, where hardly any features are represented at all. Thus, while an invaluable resource, this map cannot be regarded as entirely comprehensive or without error.

One other map needs mention here, the broad-themed *Tübinger Atlas des vorderen Orients* (TAVO). This atlas encompasses a multitude of sheets, each focusing on one of a large variety of objectives such as agriculture, topography, weather, and social conditions, including several from an archaeological perspective. The main sheet of interest to this project is one featuring archaeological sites dated between the LC and "EBA II" (ca. EJZ 1) periods, subdivided into Uruk (late 4th millennium) and post-Uruk periods (Vértesalji 1982). In terms of comprehensiveness of sites marked in the GWJ, this map necessarily cannot compete with Moortgat-Correns' one, as it lists only sites that had at that time been dated. Due to the paucity of archaeological investigations in this region, that leaves very few that the TAVO could include. However, those that are featured include sites whose dating results have not been published elsewhere – notably Tell Mu'azzar – making this map useful nonetheless.

3.3.3. Ground Truth Data

3.3.3.1. Traveller's Reports

Often complementing their maps described above, traveller's reports were used to inform this research on both sites and landscapes in regions devoid of later, more detailed investigation. Von Oppenheim's article on his 1899 journey includes some information on the Balikh-Euphrates steppe, as there is a mention of around 40 to 50 sites located along his route; a large number for the narrow corridor of visible features along a single line of travel, and further indication of the large archaeological potential of this region (von Oppenheim 1901: 83). The northern section of the Western Jazira, although also traversed, gets little mention, save for the anecdotal existence of a stone statue of a wild boar (sans head) atop Tell Khanzir. More useful are von Oppenheim's statements with regard to his visit to the Jebel Abd al-Aziz. Looking south from the top of that mountain range towards the Euphrates, "*sah [er] … eine grosse Anzahl weiterer Ruinenorte*"[63] (von Oppenheim 1901: 91). This is a valuable confirmation of the large number of features identified in this area by my research.

[63] "[he saw a large number of further sites]"

The travels of Alois Musil passed close by two of the major sites in the area. First, his expedition stopped by the 25-metre deep well of al-Malha, just south of Khirbet Malhat (which Musil simply refers to as “the ruins of al-Malha”), noting also that a second well, Mlehan, lay northeast of the site (Musil 1927: 87-88). Although Khirbet Malhat itself was not visited due to the danger of bandits from the Jebel Abd al-Aziz, the existence of two wells in its close vicinity is useful evidence for analyses of the region’s potential for settlement sustainability. Further such evidence for other locations come from Musil’s (1927: 89) account of his visit to the well of “Bir az-Zhamak” (20 metres deep); from map location and toponym in close proximity to Tell Zahamak, though Musil does not mention the site. A more tentative identification is the mention of “Gibb as-Sa’ir” (*ibidem*: 90) – Jibb al-Sha’ir using my transliteration – marked as a well on the accompanying map. This feature’s locational and toponymic similarities with the site of Tell Sha’ir lead to the possible conclusion that this is yet another water source near a major site of the southern Western Jazira.

Von Oppenheim’s 1943 publication was to be his last, and appropriately summarises his life’s travels throughout Upper Mesopotamia. The written portion of this work is mainly designed as an extended accompaniment to the map originally included with the volume; unfortunately missing from the only copy publicly available. Although detailed in brief, this work nevertheless provides a comprehensive overview of von Oppenheim’s travels; especially useful for his later journeys, which are otherwise unpublished. Of particular interest is the report of his April 1913 journey to the Jebel Abd al-Aziz and the landscape to its west. Following a visit to Tell Mabtuh Gharbi (called “Munbateh”), where von Oppenheim claims to have found evidence of later occupation (presumably of Hellenistic or Roman periods), the exploration headed west, where the rock reliefs of Ras al-Tell were first discovered. Continuing in this direction, von Oppenheim (1943: 17) crossed the “*völlig unbekanntes Gelände nach Rakka, wobei [er] mehrfach kleine Ruinenstätten [auffand]*”[64]. This constitutes another confirmation of the findings of this project.

Of greatest use amongst the early traveller’s reports are the detailed descriptions and plans by von Oppenheim of eight of the major two-tiered fortified sites in the GWJ, published from his personal journals by Moortgat-Correns (1972: 26-35; Section 2.1.2.1). These comprise the Tells Chuera, Abu Shakhat, Khanzir, Mabtuh Gharbi, al-Magher, Mabtuh Sharqi, Mu’azzar, and Khirbet Malhat. For each of these settlements, von Oppenheim describes their surroundings, topographical form, structural components (such

[64] “[completely unknown landscape towards Raqqa, where he discovered several small sites]”

as city walls or buildings), and features in the vicinity. Such information is extremely valuable, especially as very little other data exists for the majority of these locations. Further brief descriptions by von Oppenheim of sites in the GWJ are to be found in Moortgat-Correns' (1992: 13-28) book mainly dealing with the Islamic site of Kharab Sayyar. Together, this data adds greatly to the understanding of the largest tell sites of the GWJ and their environments, especially as much of it is undetectable via remote sensing techniques.

3.3.3.2. Archaeological Site Visits

Site visits of an archaeologically-minded nature commenced in the Western Jazira in the 1970s, and were described in detail in the last chapter (Sections 2.1.4.1-3). This précis includes only those that were used in the process of this research, commencing with site visits within the purview of the TAVO Survey of the Lower Khabur in 1975 and 1977. Information on the morphology and periods of occupation of the five Western Jaziran settlements investigated by the survey team (Tells Murtiya, Mu'azzar, Mityaha, Barud, and Maraza) from both Röllig and Kühne (1977-78, 1983) and Preuss (1989) were incorporated into this study's database. Details on the site of Khirbet Malhat were gleaned from both Kühne's (1983) and Quenet and Sultan's (2014) visits, with the latter providing detailed information on the size, fortifications, and surface material of individual sections of the settlement. Details on four EBA tell sites in the southern Balikh-Euphrates uplands (Khirbet Taha, Tell Jedi, Tell Shayir, and Joub al-Shayir) were incorporated from the Sweyhat Regional Reconnaissance; including both morphology and relatively precise EBA occupation periods (Danti 2000: 273-279). Finally, the ceramic data collected by the regional analyses of the Tell Sheikh Hamad team (Kühne & Schneider 1988; Schneider & Daszkiewicz 2001) from a variety of tell sites in the Western Jazira provided dating evidence. However, these analyses were purely material-based, providing no information on the size, form, or type of the sites.

3.3.3.3. Excavation Reports

Reports on excavations of sites in the GWJ are amongst the most important sources used for this study, as they are vital for ground control. Although little such archaeological work has been carried out or documented in the region, the few that exist are very detailed and provide ample data. These have been broken down and analysed in detail in Section 2.1.3; what follows is merely a brief overview. By far the most used report was the extensive most recent publication of the excavations at Tell Chuera, covering work from 1998 to 2005 (Meyer [ed.] 2010). Not only does this provide a holistic overview of the work done during that time period, it also corrects many of the inaccurate observations and at times erroneous interpretations previously made by Moortgat. These include, for example, the dating of the site to the early to late 3rd millennium BC, rather than the late 3rd millennium alone (Meyer 2010a: 15-16); and the falling into disrepair of the inner wall contemporaneous with the construction of the outer wall, rather than a simultaneously maintained double-walled system (Meyer 2007; Falb 2010). However, useful excavation, as well as regional and environmental, information was also obtained from the previous report on work carried out between 1986 and 1992 (Orthmann [ed.] 1995; especially Weicken & Wener 1995). Some further information was gleaned from earlier reports (e.g. Moortgat 1965); however, the interpretations and conclusions of these were mediated through the lens of the later results. Finally, the work of Hempelmann (2013) was used to obtain additional excavation data uncovered after 2005, though none contradicted the results of 1998-2005.

Two further sets of excavation reports were used. One of these was the series detailing the ten seasons of excavations at both the 3rd millennium tell and early Islamic settlement of Kharab Sayyar from 1997 to 2008 in the *Mitteilungen der deutschen Orient-Gesellschaft zu Berlin* journal. Of these, those dealing with the excavations of 2000, 2003, and 2004 (Meyer *et al.* 2001, 2003, 2005) were chiefly used, as it was those years' work that focused on the tell site. The other report used was a single article detailing the combined results of the 2005-2006 excavations at the primarily Halaf and Ubaid settlement of Tell Tawila (Becker *et al.* 2007). This extensive report features sections on the four distinct excavation areas, the dating of the ceramics and small finds, the lithic and faunal assemblages, and the magnetometry survey.

3.3.3.4. Survey Reports

As with the excavation reports listed above, these survey reports have been covered in great detail in the last chapter (Sections 2.1.4.4-5, 2.1.4.7); thus this is only a summary of the main ones used for this research. These comprise three primary reports, relating to the three main surveys used, as well as a handful of supplementary ones. The first major report, on the *Westjazira* Survey, is a 1993 article published in the *Damaszener Mitteilungen* journal (Einwag 1993). While this is only a preliminary report, it provides a good overview of the full geographical and temporal scope of the survey. However, further details pertaining to surveyed sites dated to the Iron Age stem from a more recent article in a collected volume (Einwag 2000).

The second primary report, dealing with the Yale Khabur Survey around the Jebel Abd al-Aziz, is not a single volume or article, but a collection of three of very short articles by the Khabur Basin Project, never published, but compiled in the *Papers of the Yale University Khabur Basin Project* (Hole & Kouchoukos 1995, 1996a, 1996b). While these provide an overview of the entire temporal scope of the survey's results, they are a cursory summary. Further detail and depth on the survey was obtained from Chapter 7 of Kouchoukos' PhD thesis, which provides an excellent overview of the regional geography, but archaeologically only deals with settlements dated to the 3rd millennium BC (Kouchoukos 1998: 317-395).

The final major report used by this research is an M.A. thesis that provides a summary of those results of the Wadi Hamar Survey that pertain to sites dated to the EBA and/or the Islamic era (Kudlek 2006). Though this work goes into a fair amount of detail for each site surveyed, it is temporally limited. A broader overview is given in a very brief article in the non-academic journal *Alter Orient Aktuell* (Pruß 2005). This latter report is extremely cursory; however it does provide some results from additional time periods such as the MBA and LBA. Some additional data on the sites of Tell Dakhliz, Mjeddi, ‘Ajila, and Tell Zaidi, all within the survey area, exists in Hempelmann (2013: 187-193), who also provides the most detailed breakdowns of occupation periods; unfortunately only for these four sites.

3.3.3.5. Raw Survey Data

To supplement the rather poorly published surveys listed above, a couple of raw datasets in the form of site information tables and digitised mapping files were available for this research. The most important of these was the Excel table provided by Veronika Kudlek of the Goethe-Universität Frankfurt containing all data from the Wadi Hamar Survey conducted by Alexander Pruß in 1997-2000 as well as from Kudlek's 2008-2009 expansion of the survey area, the latter of which has not been published in any form. This spreadsheet contains information on site toponym, location, size, type, material remains, and dating, as well as modern land use and distance to water sources. Access to this data allowed the Wadi Hamar Survey to be used as the primary ground truth source for this research.

The other such dataset I acquired was a GoogleEarth KML file of EBA settlements in the *Westjazira* Survey of 1991-1992, provided by Christoph Fink of the Johannes

Gutenberg-Universität Mainz. This allowed me to both confirm and expand on which of the sites listed in Einwag's (1993) article had been dated to that period, but also to identify the locations of a few additional sites not mentioned by Einwag, as well as toponyms for ones mentioned but not named. This useful addition to this cursorily published survey allowed it to be used to the same level of precision as the other two.

3.3.4. Environmental Data

As discussed in Section 1.2.3, the palaeoclimate of the Near East is the subject of both debate and low-precision measurements of general trends, leading to a great amount of uncertainty surrounding the evidence for past environmental conditions. Additionally, there are currently no local proxy records within the GWJ itself. Thus in line with other landscape studies conducted in the greater region (amongst many others Bradbury *et al.* 2014; Casana 2013; Geyer *et al.* 2007; Lawrence 2012; Rayne 2014; Wilkinson *et al.* 2012), in the absence of geographically relevant past environmental data with a high degree of spatial and temporal control, modern rainfall estimates (provided by the GPCC; see Section 1.2.2.2) were used to analyse the GWJ in this thesis. Despite possible differences in precipitation levels at various times in the past from modern values, I believe the latter to be sufficiently accurate estimates as to allow for competent analyses for two reasons other than expediency. First, as can be inferred from Figure 1.8, the *relative* correlations between isohyets of modern and palaeoclimatic estimates are mostly consistent. That is to say, all isohyets shifted by roughly the same distance on the ground; thus during a dry period in the past, for example, a location in the north of the GWJ would have received on average the same reduced amount of rainfall compared to modern day values as a location in the south. Thus relative climatic comparisons between ancient sites in areas of differing precipitation values remain relevant when using modern data.

Secondly, the modern values form a rough midway average between the two estimates by Kalayci (2013: 109-111) of early and late 3rd millennium BC rainfall. Given both long-term variations in average climatic conditions over the 3rd millennium BC, as well as the high inter-annual fluctuations in the semi-arid steppe, average values are the only feasible option for analysing environmental issues faced by long-term settlement – and would be even if precise and complete palaeoclimatic data were available. Therefore the absence of such data does not impede analyses any more than does the nature of the local climate of the GWJ across all time periods.

Section 3.4: Research Method

3.4.1. Overview

The methodology employed by this research was developed based on the premise of ground control data being available. Thus the process described below adheres to the order in which data analysis was carried out for areas where this was the case. For areas without ground control, the methodology remained largely unchanged, with the exception of it commencing at Section 3.4.3, and using CORONA imagery, rather than ground truth, as the highest level of feature identification confirmation; the same methodology having been employed by the Fragile Crescent Project to great effect (Galiatsatos *et al.* 2009; Lawrence *et al.* 2012). The following processes were all carried out within the ArcMap program of the ArcGIS software package, with the occasional assistance of ArcCatalog.

3.4.2. Ground Control Data

The importance of data from surface investigations, be they excavation, survey, or merely site visits, for studies such as this cannot be overstated. Any remote sensing analysis of an archaeological landscape benefits enormously from this component for both accurate site identification and settlement dating (Wilkinson 2000a). For this research of the GWJ, the few ground control data that exist were studied in great detail, and given the ultimate say in determining the type and period of any feature. These included three excavations and three surveys, all described above, as well as a few site visits and surface collections of pottery and other artefacts. Furthermore, the comparison of surface data with that obtained via remote sensing enabled the creation of relationships between them, which were subsequently for extrapolation in regions lacking ground control. While excavation data was examined first, as its in-depth results informed the majority of subsequent identifications, survey data was arguably more useful, giving information on a wider range of site types and periods. This information was all combined and evaluated as one before being used to inform the rest of the study.

3.4.2.1. Excavation Data

Results from excavations, mainly those at Tell Chuera, were used in a variety of ways to inform the subsequent landscape analysis process. On a very basic level, the known site type and components within an excavated site, when compared with how they appear on remote sensing data, were used to create connections used to interpret other sites. This was both true of features that appear on remote sensing as well as those which do not. Using a rudimentary example, Tell Chuera's excavations show that it consisted of an upper and lower town terrace, each with different levels of elevation (Meyer 2010a), which results in a distinct look on CORONA satellite imagery (Fig. 3.5). Thus other sites with the same appearance can be reasonably assumed to also have the same two-tiered fortifications. However, results from excavation data are also vital to emphasise the limitations of remote sensing-based analyses. For example, the excavations at Tell Kharab Sayyar uncovered evidence of an enclosing fortification wall consisting of two phases of construction (Meyer *et al*. 2003: 86), despite no hint of this being directly visible via remote sensing[65] (Fig. 3.6). Thus excavation results also warn against the dangers of assuming that past features within a site will necessarily be visible in the present day and on the surface.

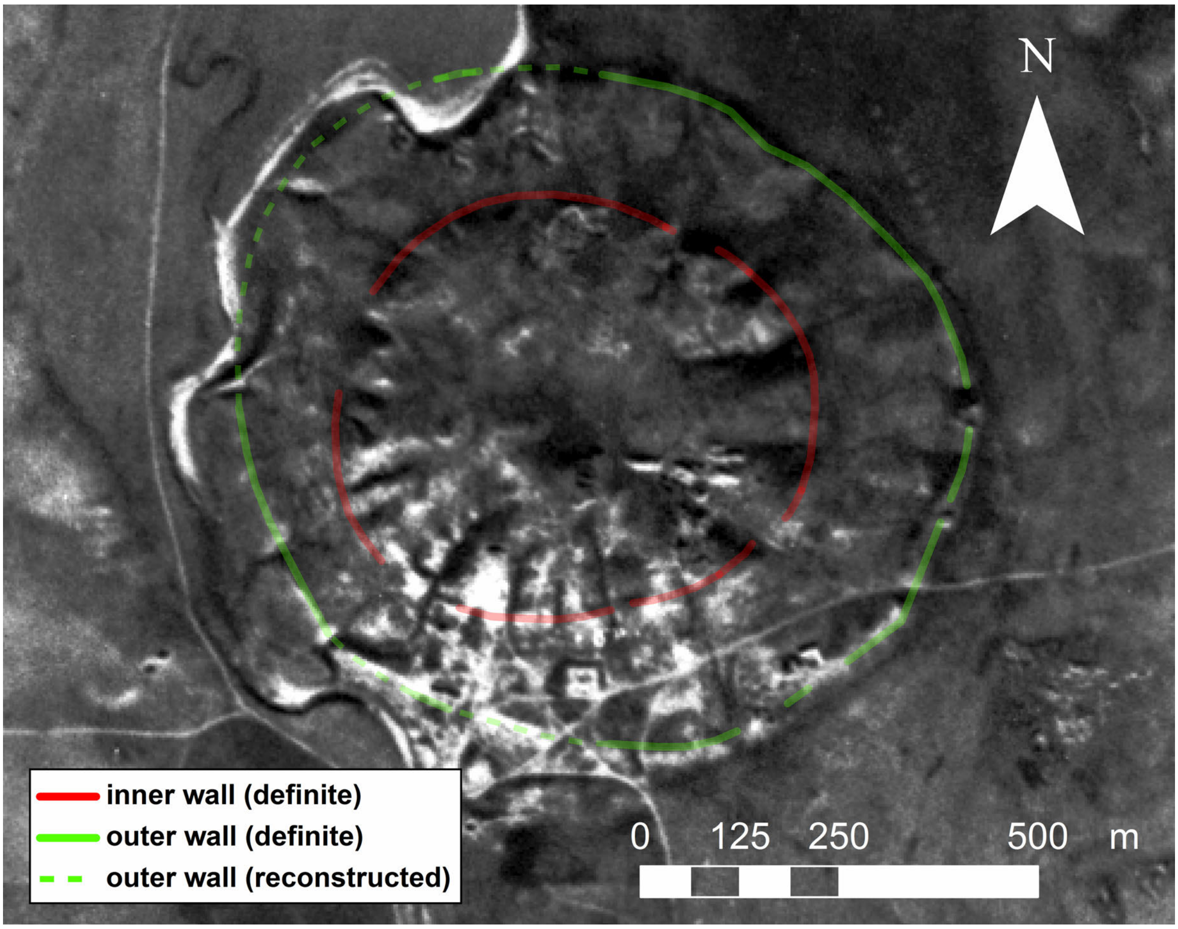


Figure 3.5: Line drawing of Tell Chuera (from Fig. 2.3) superimposed on a CORONA satellite photograph of the site. Note the mostly clear visibility of the boundary between the upper and lower towns and the outer wall on the latter imagery; though note also the erroneous appearance of the outer wall to the northwest, where the Wadi Chuera has cut into the site.

[65] Though note that Lawrence (2012: 145-146) considers the high conical shape of many tell sites to be itself evidence for fortifications, which acted as retaining walls to prevent heavy erosion.

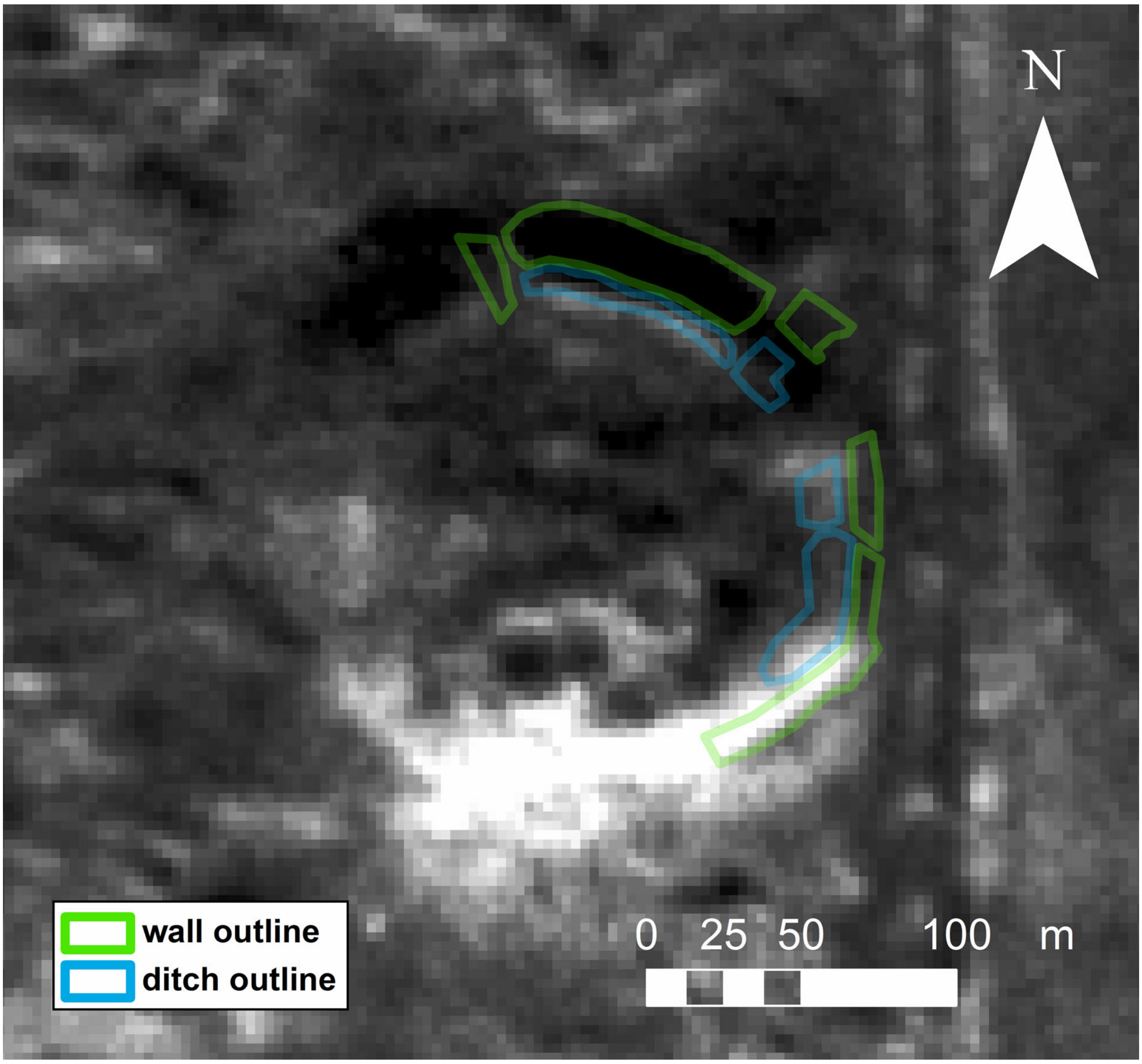


Figure 3.6: Line drawing of Tell Kharab Sayyar – based on geomagnetic prospection (Meyer *et al.* 2007: Abb. 2) – superimposed on a CORONA satellite photograph of the site. Note the absence of clear, obvious fortifications on the latter imagery, in part due to resolution limits because of the site's small size.

Perhaps the most significant contribution of excavation data to this research, however, is dating evidence, and with it settlement chronology. On an elementary level, the methods used by a project such as that at Tell Chuera, including stratigraphic sequencing, pottery typologies, and calibrated radiocarbon dates, provide a clear settlement sequence; with the beginning and end of human occupation well defined. Thus one can use this date range to estimate periods of occupation in surrounding areas, although survey data is more accurate for this (see below). Furthermore, similar periods of occupation for similar site types found elsewhere can be tentatively assumed, although only as an inconclusive working hypothesis. More importantly, and more specific to excavation data, the chronology of individual components within a site (such as the asynchronous use of Tell Chuera's two walls) can be determined, providing data which is invisible to remote sensing. Thus once again, the limitations of remote sensing become clear through the use of ground truth data, enabling a more honest assessment of the validity of apparent discoveries made using it elsewhere.

Other data associated with excavation projects further helped verify and/or calibrate remote sensing data. For instance, detailed topographical plans of sites were compared to sites' appearances on satellite imagery. Those images from CORONA missions, for example, which most closely matched the topographical ground plan, could be deemed to have increased accuracy in the area over others. The same was done for ASTER data, where elevation features existent on topographical plans but not the DEM were noted so that their apparent absence on other sites of a similar type might be viewed more sceptically.

3.4.2.2. Survey Data

Data from the three surveys available for the region of study was individually analysed carefully before being joined and incorporated into this project's main database. First, the different survey methods used were compared and adjusted to conform to a uniform model. This involved taking into account the relative sizes of the areas surveyed, the number of seasons of fieldwork, the number of team members involved, and whether the process was carried out on foot or by vehicle. Thus, for example, the number of sites identified by the two-season, vehicle-based, 2000 km^2 Yale Khabur Survey could not be directly compared with that of the five-season, on-foot, 450 km^2 Wadi Hamar Survey. Thus this thesis' analysis of the Yale Khabur Survey area must be considered more remote sensing-based, with less ground control to rely on, than that of the Wadi Hamar Survey area. These important distinctions between the surveys used were evened out in the analysis process by the uniformity of the remote sensing data.

Once the data from these surveys had been sufficiently homogenised, they were added to the database. This involved recording the location of sites identified on the ground, their site type, periods of occupation, and any additional information on their form or structure. This in turn was used to inform site identification of features recognised only by remote sensing, as a comparative list of sites' appearances on remote sensing data and their site type identification on the ground was drawn up. Such data firmly anchors all remote sensing-based identifications made by this thesis, and without it this research could not have taken place with sufficient confidence in its validity.

Information on site dating, meanwhile, not only allowed the settlement patterns across the GWJ to be mapped over time but also enabled the creation of another comparative list; sites' appearances on remote sensing and their periods of occupation. This was further used

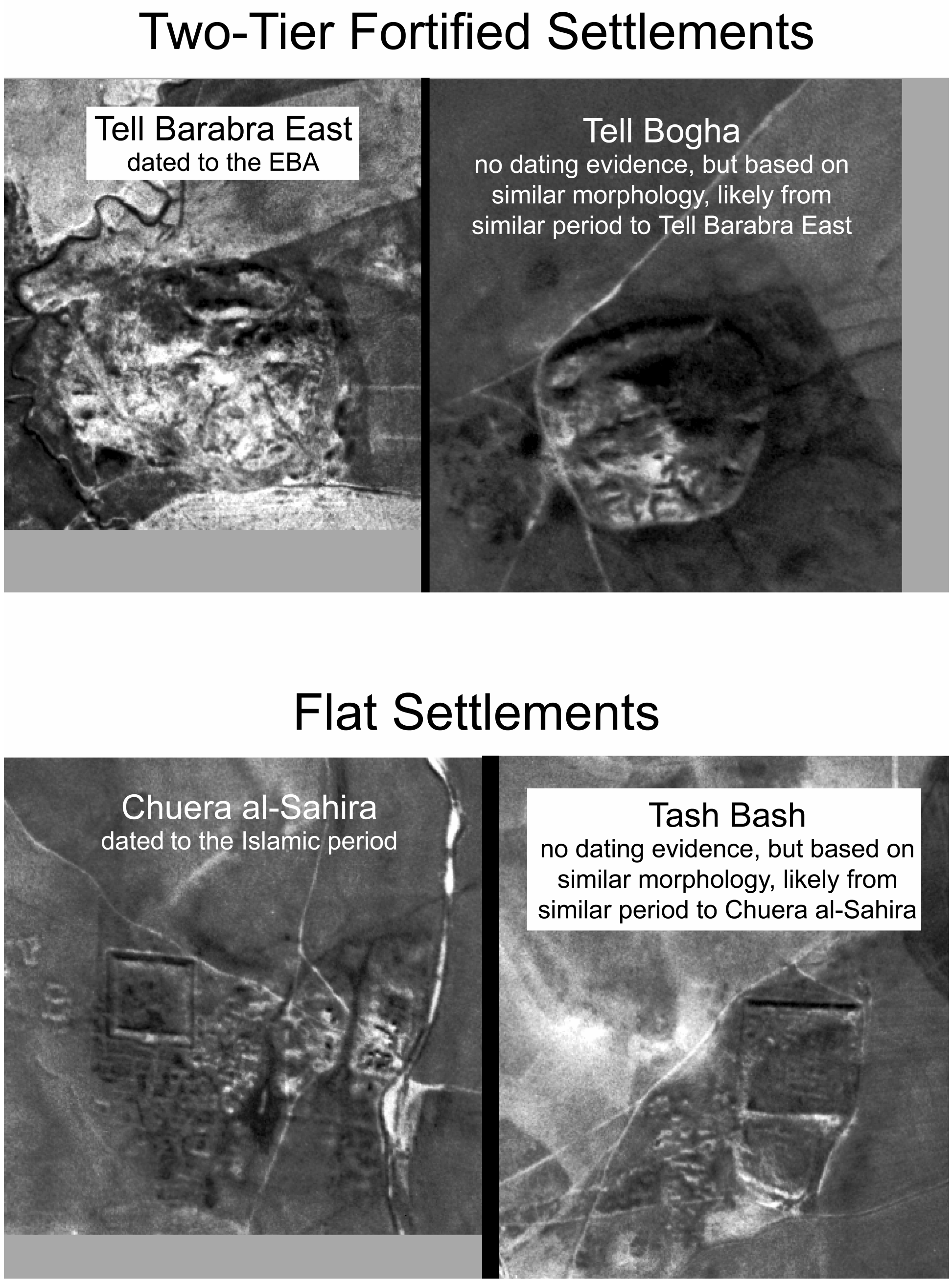


Figure 3.7: CORONA satellite imagery showing the appearances of dated sites of the EBA two-tiered fortified tell and Islamic settlement types, with examples of other sites with similar appearances that can confidently be ascribed to the same occupation periods.

to extrapolate an estimate for broad settlement periods at other sites, or at least the period when the visible part of a site was constructed. For example, several two-tiered fortified settlements have been dated by ground data to the EBA; thus other sites with their distinctive morphology could fairly confidently be dated to that time period also (Lawrence *et al.* 2012: 354-355). Meanwhile rectangular flat settlements such as Kharab Sayyar, which appear very clearly on satellite imagery, have been conclusively dated to the Islamic era, providing another clear dateable morphology type (Fig. 3.7). As with similar data from excavation results, the limitations of remote sensing were again made clear here. Thus a circular tell site identified on CORONA imagery, for example, which can safely be dated to the EBA, could have been occupied previously (such as during the LC period, like at Tell Chuera) or subsequently (such as during the Iron Age, like at Tell Ghajar al-Kebir) without any evidence for this being visible. In other words, such extrapolation, even within its own limits, only works at all for the construction and occupation of the major features of a site.

3.4.2.3. Site Visit Data

Though naturally fewer and less detailed data is gathered from a ground visit to an archaeological site than through excavation or survey, it is nevertheless superior to remote sensing alone, and can be used to supplement this. In the GWJ, there are several major sites that have been visited, but not formally surveyed, let alone excavated. These include, for example, Tell Maraza, visited by the TAVO survey, and Khirbet Malhat, visited by Hartmut Kühne and later Philippe Quenet. The form and structure of these sites, as identified on the ground, were used to interpret their appearance on remote sensing data in the same manner as surveyed sites, as described above. The same is true of sites identified by the Sweyhat Regional Reconnaissance, four of which were described in enough detail to determine morphology and occupation periods; though the latter is limited to the investigation's EBA focus. Further data available from site visits is dating information from ceramic surface scatter, although this provides positive data alone. A large number of sites in the GWJ contain only such data, including the major settlements of Tells Abu Shakhat, Khanzir, Mabtuh Gharbi, al-Magher, and Mu'azzar. These were added to the database; however such sites were marked as having "neutral", rather than negative, data for periods not identified by the ground visits.

3.4.3. Remote Sensing Data

3.4.3.1. CORONA

Having acquired multiple datasets of enough CORONA imagery to cover the entire region of study, this research commenced its remote sensing portion by visually analysing each part of these images in close-up. Its maximum native resolution allowed analysis to be conducted with these zoomed to a scale of 1:11,000. Drawing horizontal lines of latitude superimposed on the images enabled a systematic process, looking at one section at a time before moving on to the next segment eastwards or westwards; when one "line" was complete, the next section southwards was commenced. Thus the entire GWJ was combed in a total of 130 latitudinal lines, with every part of the landscape having been viewed at the images' native resolution at some point.

This process bears certain similarities in its holistic nature to a similar ongoing remote sensing survey conducted simultaneously by Jesse Casana's research team at the Center for Advanced Spatial Technologies (CAST) of the University of Arkansas. However, significant differences also exist between these, both in terms of scope and aims, as well as procedure. Firstly, the CAST team's objective is the documentation of sites in the entire northern Fertile Crescent, a 300,000 km^2 area stretching from the eastern Mediterranean coast to the mountains of northern Iraq (Casana 2014: 226). As such, their ambitious research is necessarily broader, and thus does not feature the detail of an in-depth investigation of a specifically-bounded geographical region. Secondly, at the commencement of their project, they did not have access to the full corpus of ground truth data that I did; especially raw data from the *Westjazira* and Wadi Hamar Surveys. This is clearly evidenced by a comparison between the previously-known sites in the steppe regions of the GWJ according to Casana (2014: 226-228) and my project (Fig. 3.8).

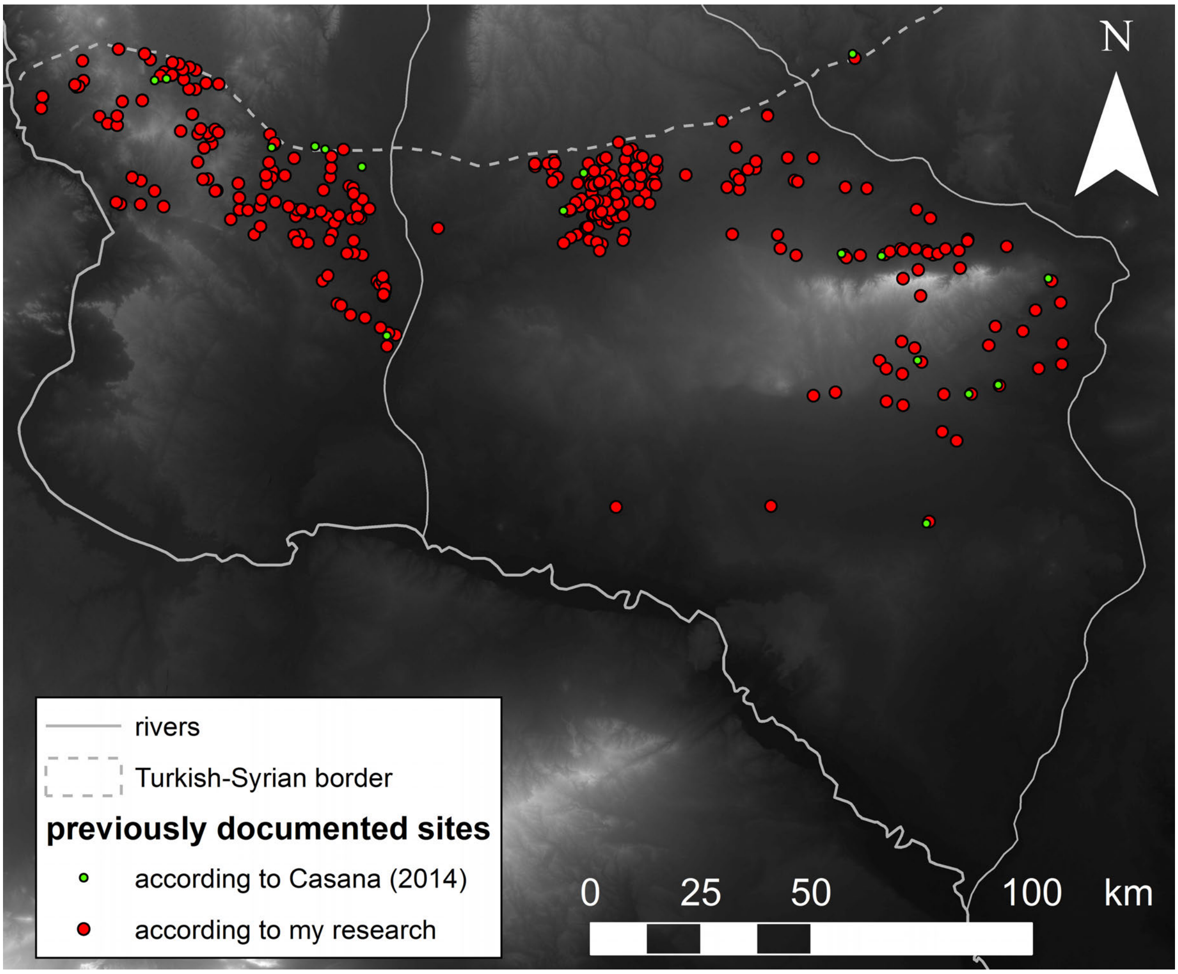


Figure 3.8: Map showing the locations of Greater Western Jaziran steppe sites previously identified according to Casana (2014: Fig. 2), and according to my research.

Thirdly, the methodology of the CAST team is to divide the region of study into 10 by 10 km grids and employ four trained students to identify potential features within one grid at a time (*ibidem*: 228). This differs from my latitudinal strip approach which, I believe, helps mitigate unintentional biases arising from the researcher gaining a heightened familiarity with individual areas of similar geography and archaeology. At the same time, having a single analyst (myself) investigate the entire research area enabled greater consistency of feature identification.

The ArcMap program allows for the editing of brightness, contrast, and colour levels (or, in this case, greyscale levels) of any image imported. With CORONA imagery, this manipulation allows the user to adjust the images so as to emphasise certain features' details over others. In general, this analysis was carried out with all CORONA image strips adjusted to the same settings, allowing for an equal level of feature detection across the board. Thus initially, all images were set to a standard deviation greyscale histogram stretch[66]. This histogram stretch was manually altered, however, when it was deemed necessary in order to accentuate a potential archaeological feature. By tweaking the settings on a case-by-case basis, but always returning them to the standard deviation stretch for the continuing analysis, it was possible to both get the best view of each site and conduct a study under uniform, controlled conditions.

Features sought after using CORONA ranged from ones that are manifested as topographical elevations in the landscape to those only visible by variations in shading on the greyscale satellite imagery. Any potential feature that could have archaeological significance, and had not already been digitised from ground truth data, was marked; its position pinpointed by chiefly using Mission 1038-2 images due to their greater locational accuracy. Where the features in question were only visible on CORONA missions with less accurate georeferencing (for example Mission 1105-1), its relative position on Mission 1038-2 imagery would be determined with relation to surrounding geographical features (e.g. mountains, rivers, roads, etc.) and marked accordingly. Each of these features would then be assigned a site type and a site clarity classification, which are described in Sections 3.5.2.1-2. These typological identifications would always bow to the results of ground truth data, if any existed, regardless of a site's appearance on the imagery.

[66] A graphical manipulation that modifies the distribution of the image's discrete pixel intensity levels by a factor of the average deviation of that distribution from its mean.

3.4.3.2. ASTER DEM

Following the identification of a potential archaeological feature lacking ground truth data using CORONA images as described above, ASTER DEMs were at times implemented as backup data. For the purpose of a reasonably paced analysis, this was only done when the feature in question fell into the "tentative" category of site clarity[67] on initial viewing. Due to the varied nature of features described above, this was not always helpful, as flat sites naturally do not show up on such data. Nevertheless, the high resolution of ASTER, combined with the large percentage of medium-to-large sized LC and EBA sites that do manifest as topographic protuberances, made it a useful addition to this research. The ASTER tiles were set to display their elevation data using a greyscale gradient based on a linear distribution between the maximum and minimum values for each display extent. That is, every close-up view required was used to calculate the visualisation of the ASTER data for each scene. Thus any topographic variances of anthropogenic origin were most prominently highlighted, and compared to the supposed location of features on the CORONAs. Combining these two datasets allowed for a refinement of the site clarity classification, for example to change a site deemed only "tentative" based on CORONA imagery to "probable".

3.4.3.3. GoogleEarth

The modern imagery provided via GoogleEarth, most notably GeoEye, was used in one of two different ways, depending on the situation. Features that were unclear on CORONA imagery (or that were located in the few areas with only poor quality CORONA coverage) and fell into the category of flat sites unidentifiable on DEMs would be sought on GoogleEarth. Their visibility on that imagery would affect the potential site's clarity classification in the same manner as its identification on ASTER described above. In this manner, GoogleEarth would simply be used as an added backup dataset when required. For large, prominent, newly discovered, particularly unusual, and/or ground-truthed sites, however, GeoEye imagery (when available) would be used to provide an additional view from a different time period. The variations in the type of image produced by modern digital satellite cameras versus 1960s greyscale photographic film like CORONA, as well as landscape changes that have occurred in the intervening 40-50 years, mean that different features within a site can appear clearer on one or the other dataset. In this case, the

[67] See Section 3.4.2.2 for a clarification of this categorisation.

addition of GoogleEarth data was employed to create a fuller, more accurate picture of important sites highlighted by this thesis.

3.4.3.4. Maps

Following the identification of sites as described above, there still being uncertainty or unknown details, maps would be used to fill these gaps. The main such use was to identify toponyms of obscure sites. Maps such as those published by von Oppenheim (1911) and Kiepert (1910/1915a, b) include a far greater number of sites and locations bearing the prefix “Tell” than more modern archaeological maps such as the TAVO (Vértesalji 1982). These “identifications” must of course be treated with caution, as must their geographical locations. However, by importing scanned copies of these into the ArcMap program, and georeferencing them to the CORONA imagery using landmarks such as rivers and modern cities, locational matches with site identifications based on the above process could be made. Thus sites could be given names in the results database, with the source of the identification of their toponyms noted in each case. For example, the location of Tell Jerwa, a site identified by my remote sensing analysis and which I initially believed to have been previously undocumented, matches closely with a feature labelled “Tell Djerve” on Kiepert (1910/1915b). This led to the naming of the site as stated, and allowed the connection to be made to a brief mention of “Tell Djerwa” by von Oppenheim (Moortgat-Correns 1992: 18).

Less frequently, maps would be used for site identification backup in a similar way to ASTER and GoogleEarth data. This was mostly done with archaeological maps, primarily Moortgat-Correns (1972) and TAVO, which additionally provided some broad dating information. Locations with features marked on these maps but not identified on the ground or in the systematic analysis described above would be double-checked using remote sensing data lest a site should have been accidentally missed. However, no such site was included in the database if no record of it could be found on satellite imagery. This was not done with the intention of favouring those sites visible on satellite data, but rather necessary to deal with the uncertainty of site identifications and locations in the GWJ on even relatively recent archaeological maps.

The locations of modern features such as wells were determined from their marking on maps like that of Musil (1927), as these were not expected to be visible on satellite imagery. They were not, however, included in the main database, which exclusively contains potential archaeological features.

Section 3.5: Data Management

3.5.1. Process Overview

To manage the wealth of information gathered from this systematic analysis of the GWJ, all data was entered into digital databases using Microsoft Access software. To begin with, data points were saved to a shapefile in ArcGIS, then converted into text-based co-ordinates for input to spreadsheets, which in turn were collated in the Access program. Initially, each of the four areas of study: *Westjazira* Survey, Yale Khabur Survey, Wadi Hamar Survey, and the rest of the region with no survey data (see Fig. 4.1), were examined individually, and thus entered into separate databases. Then, these were combined into one master database, which in turn was imported as a geodatabase into ArcGIS, providing the full dataset with feature locations visualised in 2-dimensional space. This integration of the two software programs enabled examinations of both to operate in tandem, with any changes made to one automatically appearing in the other. This allowed for a streamlined results interpretation, with all the data gathered readily available at a single glance.

3.5.2. Database Structure

Every piece of data gathered on any particular feature, or potential feature, was included in both the individual and combined Microsoft Access databases created for this analysis. Basic common data recorded for all identifications were: site name, which survey area (or none) it is located in, whether it was identified on the ground or by remote sensing, and its location in Universal Transverse Mercator (UTM) Zone 37 N co-ordinates. However, more complex data was naturally also recorded, and is expanded on below. Of the following components, certain parts are only relevant to certain types of features identified, and left blank in the spreadsheet for others. Thus the list below commences with aspects relevant to all features, before explaining the more specific ones.

3.5.2.1. Site Type

All features identified, whether by ground truth or remote sensing, were assigned a site type, similar to the methodology employed by the CAST survey (Casana 2014: 228; see Section 3.4.3.1). These types were identified and refined as the process of analysis continued, and are thus based on the specific circumstances of settlement dynamics in the study region. Therefore, they are not designed to be transferable to investigations of other regions, though many of the categories have parallels elsewhere. The site types were entered into the database using a code system which was built in the order in which the features were identified (Table 3.1). At the outset of the remote sensing survey, broad categories based on those developed for the FCP database (see Section 3.5.3) were used, derived from well-known site types in Northern Mesopotamia – "Kranzhügel" tells, truncated tells, conical tells, flat settlements, and individual structures. These ended up becoming Codes 1, 2, 4, 15, and 14, respectively; however as the process of the survey continued it became clear that further subdivisions of these morphological types were required, both to define identified features more precisely (e.g. Codes 5, 13, and 18) and to acknowledge features that could fit into any one of multiple categories with a roughly-determined degree of certainty (e.g. Codes 3, 10, 11, and 17). This was carried out with the primary goal of creating a typology that was neither too broad, nor too precise with pigeon-holed features.

site type code	description
1	two-tier fortified tell site
2	truncated tell
3	probably Code 2, but level of destruction does not rule out Code 1
4	conical tell
5	flat settlement adjacent to a tell - lower town?
6	result from modern settlement/construction areas, where nature of ancient settlement not clear
7	result from modern settlement/construction areas, where nature of ancient settlement not clear, but tending towards a tell
8	indistinct shape, but visible as a separate entity
9	barely/not visible as a separate entity on image
10	tell, too destroyed to determine whether Code 2 or 4
11	probably Code 1, but level of destruction does not rule out Code 4
12	circular shape visible as a separate entity, possibly a tell
13	post-antiquity settlement
14	possible settlement with not much remaining, or a few buildings
15	flat settlement, period not known
16	undulating terrain - possible flat settlement
17	probably Code 4, but level of destruction does not rule out Code 1
18	elliptical tell
19	small circular feature
20	small elliptical feature
21	very small circular feature
22	very small elliptical feature
23	possible qanat shafts

Table 3.1: List of site type codes and their descriptions as applied in the database.

While Table 3.1 is presented here to give an idea of how this project's database was structured, its contents can be categorised more clearly by grouping several of the site type codes together for the purposes of a coherent discussion of the region. Thus Chapters 4 and 5 discuss the identified features according to the terminologies that follow:

- **Tell Settlements: Codes 1-4, 10, 11, 17, and 18**
    - Broadly, there are four main tell types identified: conical tells, truncated tells, elliptical tells, and two-tiered fortified tells, the latter of these being subdivided by wall type (see Section 3.5.2.5). Conical tells are mounded elevations, semi-circular in cross-section, whilst truncated tells have the appearance of having been horizontally "cut off" near the top. Elliptical tells tend to be of the truncated variety, however have a distinctive shape that is unique to them, rather than simply being elongated versions of the previous two types. The designation of a tell site as conical, truncated, or elliptical does not of course negate the possibility of it having featured enclosing walls; it merely indicates that these are not of the variety found in the two-tiered settlements. Indeed, the conical nature of many tells can itself be evidence for the presence of past fortifications (Lawrence 2012: 145-146).
- **Less clear manifestations of potential tell sites: Codes 7 and 12**
    - Code 7 indicates an unclear feature located underneath a modern settlement, but with aspects, such as a circular outline or conical shape on DEM data, that increase the likelihood it being a tell site. Code 12 signifies a circular feature on satellite imagery, clearly visible but with unclear indications of the usual associated factors (mound shadow on imagery, topographic variation on DEM).
- **Flat settlements: Codes 5, 13, 14, and 15**
    - The default identification for these is Code 15, referring to flat settlements of unknown periods, manifested as a collection of rectangular outlines visible on satellite imagery. Features given Code 14 are much the same, merely being a smaller or less clearly recognisable assortment of rectangles; or in some cases a single visible structure. Flat settlements in close vicinity of, and mostly abutting, tell sites were identified as possible lower towns (Code 5), though not necessarily occupied during the same periods as the tell itself. Finally, flat settlements known from ground truthing to be of Byzantine or Islamic date were separated into Code 13, as these fall well out of the period range of the remit of this thesis.

- **Less clear manifestations of potential flat settlements: Codes 6 and 16**
    - These are the equivalents of Codes 7 and 12, but for flat settlements. Code 6 indicates unclear features under modern settlement, but with nothing to indicate a mounded site. Code 16 is used for a pattern of undulating ground, indicative of former human activity (probably settlement), but without any individual structures identifiable.
- **Possible qanat: Code 23**
    - Also known as karez or falaj, this feature manifests as a series of shafts, distinctive on satellite imagery as several small bright circular features (in fact, spoil heaps of the shafts) in a linear pattern (Ur *et al.* 2013: 107-108). These are likely to have largely been constructed during the Byzantine or Islamic eras, but have the possibility of being earlier in date also.
- **Small circular features: Codes 19-22**
    - These appear most prominently on CORONA satellite imagery in the western central and southern areas of the GWJ (though hardly at all in the Balikh-Euphrates steppe). They exhibit the circular light/dark shapes of mounded sites and their shadows, yet are at most 20 metres in diameter and do not show up on DEMs. They are, however, visible on modern GeoEye imagery, suggesting them to be at least somewhat permanent. These features may be cairns of the type common in the Homs basalt region (see Bradbury & Philip 2011); however their precise nature is unclear, thus their locations were recorded for future reference, yet not incorporated into archaeological interpretations in this thesis.
- **Invisible or barely visible sites: Codes 8 and 9**
    - Archaeological features that were identified on the ground, but are either invisible or barely visible on remote sensing.

As the final two codes listed above indicate, sites visited in the field were nevertheless given a site type code based on their appearance using remote sensing, regardless of ground truth data. However, these were subsequently given a second code (using the same criteria described above and in Table 3.1) based on their *actual* interpretation. Doing so enabled the comparison of site identifications by remote sensing versus ground data, allowing this thesis' analysis to take into account with which site types the greatest discrepancies occur. This information was then fed into interpretations of features for which only remote sensing data exist.

3.5.2.2. Site Clarity

This category of data pertains to the visibility of features as identified by remote sensing. It is comprised of two parts: the first is a four-category level of clarity, the second a ratio of the number of CORONA images a feature is visible on versus the number available for the given area. The former relates to the certainty of the site type identification made using the categorisations explained above. Using such a system helped to reduce the potential of overlooking sites while at the same time limiting false positive detections by tempering tentative identifications with lower clarity values. For the ratio of CORONA images, a simple percentage was calculated, while the clarity level was given a code as follows:

- **"Definite": Code 1**
    - A feature clearly identifiable as the site type category it was assigned, as certain as it is possible to be with remote sensing data.
- **"Probable": Code 2**
    - A somewhat unclear feature, but deemed to have a greater chance of belonging to the identified site type than not.
- **"Tentative": Code 3**
    - An unclear feature with an equal or greater chance of belonging either to a different site type category than that given, or not being a site at all.
- **Verified by ground-truthing: Code 0**
    - Features with a clear site type identification based on ground truth data, such that its clarity on remote sensing is irrelevant to its classification.

These categories are, inadvertently, very similar to those employed by the CAST survey, who use a "confidence ranking" of "definite, probably, or possibly" to describe how certain the researchers are that the features in question are sites (Casana 2014: 228; see Section 3.4.3.1).

Naturally, any definition such as this involves a certain amount of subjectivity, and individual judgement over what constitutes a "definite", "probable", or "tentative" identification. Nevertheless, as these terms were applied consistently and cross-referenced with each other across the entire region of study, they can be regarded as being accurate within the purview of this investigation.

3.5.2.3. Site Period

As this data was obtained from sources which used a variety of chronologies, it was first entered into the individual survey area databases using whatever sequence employed by the projects in question. When these were combined to form a single database, however, they were transcribed to the two common chronologies used. The broad categories for this were the Palaeolithic, Epi-palaeolithic, Pre-pottery Neolithic, Halaf, Ubaid, LC, EBA, MBA, LBA, Iron Age, Roman/Byzantine, and Islamic era. This was not intended to be a consecutive continuous sequence, but exclusively recorded those periods for which evidence exists in the GWJ. The two periods of focus for this thesis were subdivided using the Santa Fe LC chronology (see Section 2.3.3) and the EJZ chronology of ARCANE (see Section 2.3.4), and their specific phases, if available, additionally recorded.

3.5.2.4. Tell Shape

This data category pertains only to tell settlements (i.e. features given identification Codes 1-4, 10, 11, 17, or 18) and contains the categories “circular”, “elliptical”, and “other”. It exists in order to record the shape of these sites as they visibly appear on remote sensing data, regardless of their actual dimensions. Thus a tell that measures 60 by 80 metres would still be classified as “circular” for this category if that is how it appears on, for example, CORONA imagery. Adding this category enabled the data analysis to even out of the irregularities present in the shape of surface features when viewed from above. Many of these stem from the varying angles at which satellite images are taken, which, despite thorough orthorectification, can significantly distort shapes (Casana *et al.* 2012). Thus a comparison between apparent feature shape and numerical measurements is useful. The “other” category refers to irregularly-shaped tells; often concave polygons.

3.5.2.5. Two-Tiered Fortified Tell Type

Tell sites given identification codes 1, 3, 11, or 17 were additionally divided into one of four main groups representing the distinct varieties of two-tiered fortified settlements described in Section 3.6. These were termed “true KH [Kranzhügel]”, “ringwall settlement”, “Dakhliz variety”, and “Matin variety” in the database for ease of recognition. The inclusion of data in this category for any given identification does not necessarily mean that such a site definitely exists (especially for the more tentative Codes 3 and 17), merely that *if* the identification of a two-tiered fortified tell is accurate, then it is most likely to fall into the category selected. If the lack of clarity of such a site was too great, however, it was given a fifth category, “other”. This term was also applied to two-tiered fortified tells of uncategorised morphology (Section 3.6.3.5).

3.5.2.6. Measurements

A variety of measurements of each site of definite shape was taken in ArcGIS, based on satellite imagery. These included features of all categories except identification Codes 8-9 and 19-23, and were made regardless of measurements taken on the ground, if these existed. This enabled an equal comparison of the relative dimensions of sites, despite possible errors in the absolute values. Measurements (in metres) were first taken of each sites’ length and width, which allowed for a rough calculation of their area (in hectares) by averaging their shape as an ellipse, using the formula **([*length*/2]*[*width*/2]*_pi_)/10000**. For two-tiered fortified tell settlements, the lengths and widths of upper and lower towns were also taken separately, allowing for a concordant rough calculation of their areas.

Far greater accuracy in the measurement of the areas of sites and sections of sites was subsequently obtained from the drawing of polygons in a shapefile overlayed onto remote sensing data in ArcGIS. The program then calculates the precise area contained within each polygon, giving a value in square metres, which merely needs to be divided by 10,000 to give hectares. It is these values that were ultimately used to comparatively determine the relative extents of settlements identified, and incorporated into this investigation’s database.

3.5.3. Integration into the Fragile Crescent Project Database

The databases created for this analysis are well suited for the landscape and settlement types present in the GWJ, but to integrate them into the FCP database, which includes data on a wide selection of regions across Northern Mesopotamia (Galiatsatos *et al.* 2009; Lawrence 2012: 43-46), some minor changes had to be made. Many of the terms used for this thesis’ data are almost exactly analogous; thus Code 1 (two-tiered fortified tell) becomes “tell (Kranzhuegel)”, Code 2 (truncated tell) becomes “tell (flat top)”, Code 4 (conical tell) becomes “tell (conical)”, and Code 18 (elliptical tell) becomes “tell (ovoid)”. Codes 5, 13, 14 and 15 are merged into “Rectilinear / Square group of structures”, while identifications which contain a degree of uncertainty (Codes 3, 10, 11, and 17) are omitted in favour of an additional data category that describes the likelihood of the site type identification made (rather than the clarity of the site on remote sensing) as “likely” or “definite” (*ibidem*: 71-72).

The data category Site Clarity (Section 3.5.2.2) is termed “Interpretation: Archaeological Significance” for the FCP database, with the somewhat different labels of “definite”, “high”, “medium” “low”, “negligible”, and “non-Site”. The first of these corresponds directly to clarity level codes 1 and 0, while “high” relates to Code 2, and “medium” or “low” to Code 3. The analysis carried out for this thesis did not include features which could be called “negligible” or “non-site”; indeed the latter of these could only be determined from a ground visit of potential features previously identified on remote sensing data.

Though this thesis’ own database records a greater amount of site-specific data, some additional information not included in it was entered into the FCP database. Significantly, these included the precise CORONA missions that the imagery used came from. Such data is useful for future researchers wishing to verify identifications of specific features, but was not deemed necessary to record specifically in this thesis, whose main objective is the interpretative theories and conclusions drawn from the data gathered.

Section 3.6: Two-Tiered Fortified Tell Classification

3.6.1. Introduction

During the course of carrying out investigations for this thesis following the methodology detailed above, one particular issue required particular attention: the variant morphologies of the two-tiered fortified tell settlements commonly known as “Kranzhügel”. These sites, fairly common across the GWJ yet a rarity in adjacent regions, are defined as follows: a) a round (though not necessarily circular) tell with a central upper town and concentric lower town on a terrace, and b) featuring at least one fortifying rampart around either the upper or lower town, with a second concentric wall around the other often also present (Fig. 3.9).

The term “two-tiered fortified tells” was created as a neutral alternative to the oft-used “Kranzhügel” descriptor, which, as is described below, has been taken to incorporate a variety of site morphologies and has been applied fairly indiscriminately to a wide range of settlements. The new term focuses only on the defining characteristics of this site type: they are tells, they are fortified, and they are spread across two height levels of settlement construction.

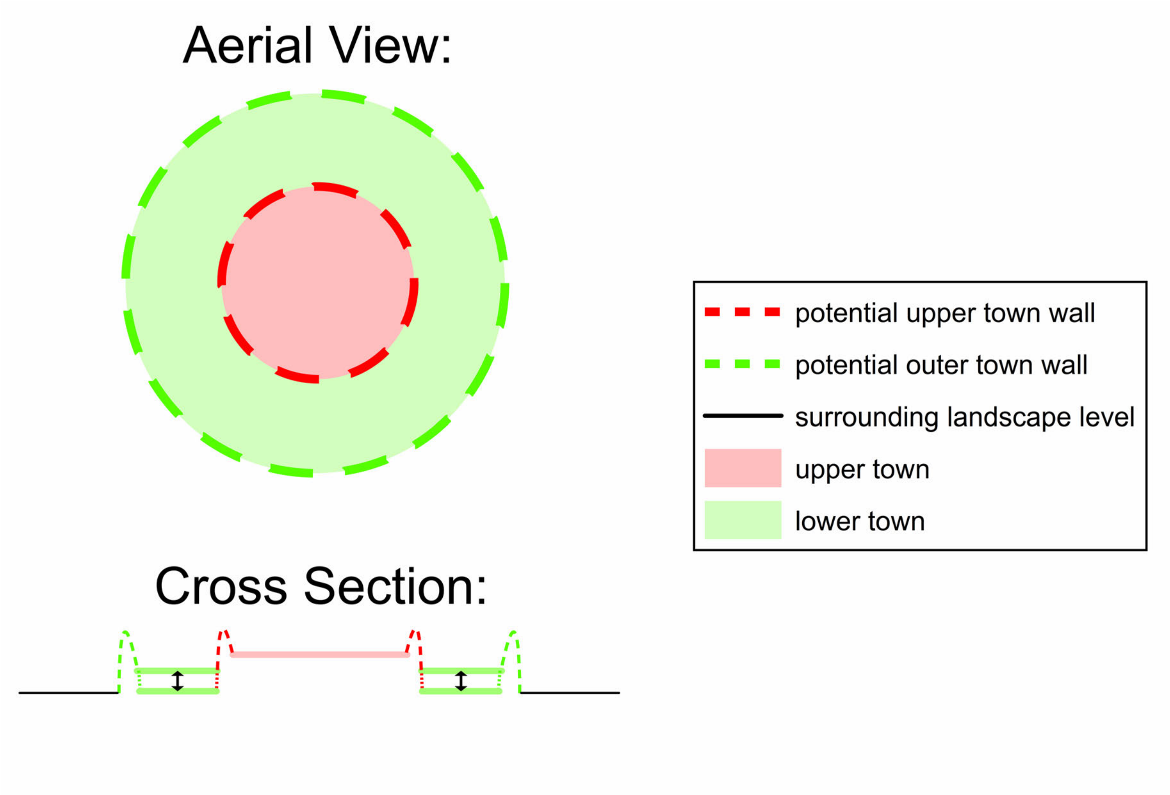


Figure 3.9: Simplified representative sketch of the basic features common to all two-tiered fortified tells.

3.6.2. The Term "Kranzhügel" as a Morphological Descriptor

3.6.2.1. Prior Applications in Literature

The word "Kranzhügel", which literally means "wreath hill" in German[68], was first coined by Max von Oppenheim as a description for the sites he encountered during his late 19th and early 20th century travels across the GWJ (see Section 2.1.2.1). In his field journals from the time, he defined "Kranzhügel" as being circular or polygonal sites each comprising an inner mound enclosed by bastions or an inner wall, surrounded by an encircling lower-level terrace enclosed by a further wall (Moortgat-Correns 1972: 26). This description is broad enough to be accurate for a large number of sites in the GWJ, including the eight singled out by von Oppenheim[69]. However, this vagueness also leads to it being applicable across a variety of otherwise heterogeneous sites. Moreover, its definition of referring to "double-walled" sites is both misleading and not universally applicable.

[68] It should be noted that, despite the widespread use of the word "Kranzhügeln [*sic*]" in several English-language publications, both the singular and plural form of the word is "Kranzhügel".
[69] These being Tells Chuera, Abu Shakhat, Khanzir, Mabtuh Gharbi, Mabtuh Sharqi, al-Magher, Mu'azzar, and Khirbet Malhat.

While for a long time after von Oppenheim's expeditions the term "Kranzhügel" remained confined to German-language literature and referred mostly to a handful of settlements in the GWJ (e.g. Moortgat 1959, Moortgat-Correns 1972), it has more recently been introduced into the general archaeological discourse and used to describe a wide range of sites in Northern Mesopotamia. The site of Tell Beydar in the Khabur river plain (Fig. 1.4) has often been called a "Kranzhügel" since the connection between the apparent morphologies of Tell Chuera and Tell Beydar was made, largely on account of aerial photographs taken by Poidebard (1934: Pl. CXXXV; Lebeau 1990: 281-283). The term has also been applied to Tell al-Rawda in central western Syria (Casana & Herrmann 2010), a site that however features many differences with von Oppenheim's definition (Castel & Peltenburg 2007: 611-612). More tentatively, though nevertheless associated in the literature, the site of Mari has been labelled a "Kranzhügel" (Lyonnet 2009; Meyer 2010c; Meyer & Hempelmann 2006) despite its location far displaced from the GWJ (Fig. 1.4) and variant EBA morphology (Margueron 2002-03: 48-49, 2004: 66-67).

3.6.2.2. Issues with Use

Two major issues exist with the way the term "Kranzhügel" has been applied in the literature up to now. The first is the false impression of homogeneity of sites that arises from the indiscriminate nature with which it has been used, applied to settlements with numerous morphological, not to mention temporal and cultural, variations. In part, this is due to the vagueness of the original term, and the lack of much precision in its definition[70]. Largely, however, this is due to the paucity of research conducted on these sites, which has led to Tell Chuera being the only well-known example. Thus a common conception of "Kranzhügel" meaning "sites like Tell Chuera" has skewed the term further, as any number of superficial morphological similarities with Chuera (such as a circular structure, two surrounding walls, and a radial street pattern) can be found at a selection of otherwise heterogeneous sites (Creekmore 2008: 362; Smith *et al.* 2014: 164-165). Furthermore, the circular form of Chuera does not even apply to all of von Oppenheim's original eight Kranzhügel, with Tell Mu'azzar, for example, being pentagonal and Tell al-Magher almost square (Moortgat-Correns 1972: 30-31).

These issues are well illustrated by examining Tell Beydar, which from aerial and satellite imagery certainly bears many similarities with Tell Chuera, and thus could be

[70] An exception is the tell classification of van Liere and Lauffray (1955: 133-134), which encompasses fortified tells in four types and eight sub-types. This admirable first attempt at separating heterogeneous fortified sites in the Jazira was however largely ignored in subsequent literature (see Section 2.1.2.4).

termed a “Kranzhügel” (Fig. 3.10; Meyer 2010a: 22). These include a central flat circular mound surrounded by an enclosing wall, beyond which a gap precedes a second clear enclosing wall. A more detailed examination of the satellite imagery shows up many differences, however. One notable distinction is that the central mound of Tell Beydar features a definite peak in the centre, as opposed to the depression visible at Tell Chuera. Perhaps even more significantly, the area between the two walls of Tell Beydar is flat, devoid of obvious architecture, and apparently at the same level as the surrounding landscape; starkly contrasted with the undulating surface of a clear terrace of Tell Chuera’s lower town (see Fig. 3.10). Excavation data further confirms these discrepancies, with evidence for the outer wall being used for burials (i.e. no longer primarily in use as a fortification) and the lower town uninhabited by Final EJZ 2, only a few centuries after initial occupation during EJZ 1 (Bretschneider 1997; Pruß 2013a: 134-136). Thus with continued use of the term “Kranzhügel” to describe Tell Beydar (e.g. Gavagnin & Mas 2014), this creates a false impression of site type homogeneity with Tell Chuera, something already noted by Meyer (2010a: 22) and Andrew Creekmore (2008: 342-343), who perceptively states that “the urban plans at Chuera and Beydar have little in common, and certainly are not more similar to each other than they are to non-*Kranzhügel* sites”. Meanwhile, Tell al-Rawda and Mari feature equally, if not more, significant discrepancies with the “Kranzhügel” descriptor, with the additional issue of the ongoing re-evaluation of the reconstructed morphology of the latter site (Butterlin 2010: 173-181; 2013: 260; in press).

The second major issue that exists with the indiscriminate use of the term “Kranzhügel” is the misconceptions of and variations within the developmental histories of sites to which it is applied. Specifically, the term “double-walled”, or similar phrasings, are often used to describe an apparently integral part of the “Kranzhügel” definition (e.g. Nishimura 2014: 81; Ristvet 2015: 55). While two sets of concentric city walls are certainly often the most prominent feature in the appearance of such sites on satellite imagery (see Fig. 3.10), this is not always the case. As is described below in Section 3.6.3, several sites with morphologies very similar to Tell Chuera-style “Kranzhügel” do not feature a second (outer) city wall. Thus the concern of wrongly assumed homogeneity is again a problem here. However the issue of the term “double-walled” (or similar) additionally goes beyond this, for it heavily implies that both walls were in use simultaneously as defensive structures, and hence that upper and lower towns were inhabited at the same time. This is not consistently the case, however.

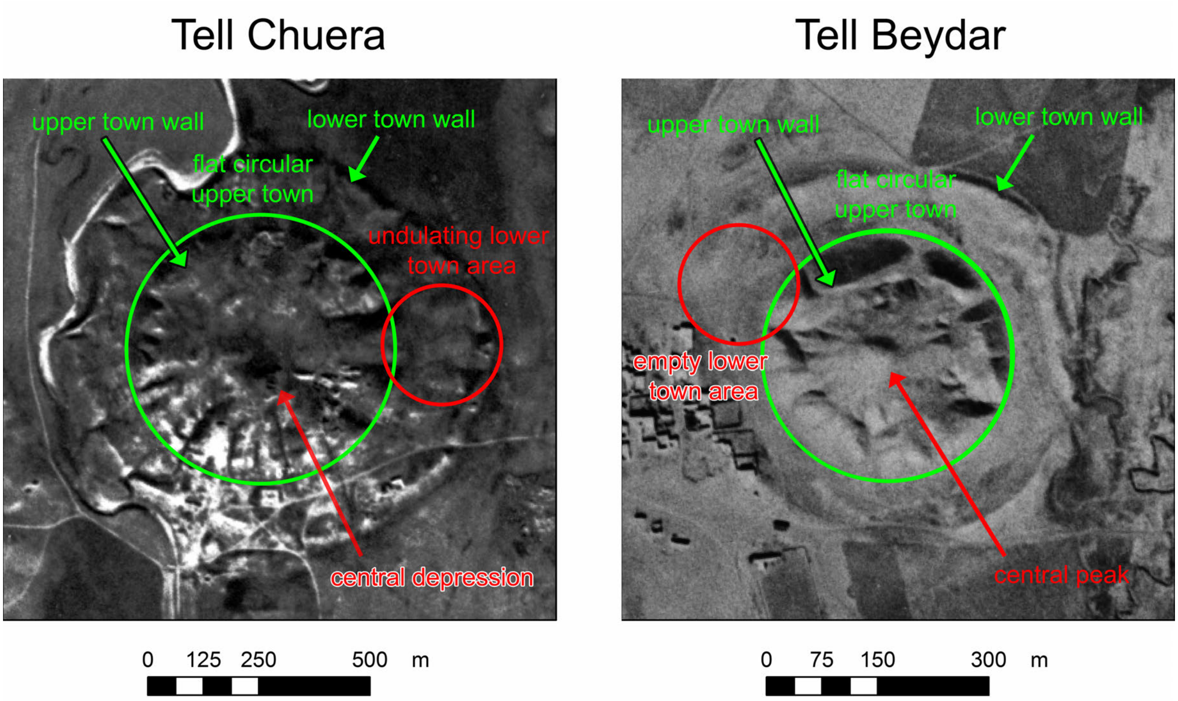


Figure 3.10: Comparative CORONA satellite imagery of Tells Chuera and Beydar, with features common to both labelled in green and differing features labelled in red.

As described above, the outer wall of Tell Beydar, for example, fell into disrepair by Final EJZ 2; thus the site was only "double-walled" for the first three centuries of its eight-century long EBA occupation. Meanwhile, the "Kranzhügel" type-site of Tell Chuera never saw both walls in use. As described in detail in Section 2.1.3.1, Chuera began as a single-walled tell and later expanded into its lower town, as which point a new outer wall was constructed simultaneously with the abandonment of the inner wall as a defensive structure (Meyer 2010c). Although this fact is relatively well known and disseminated in the literature, the continued concept of a "Kranzhügel" as a circular site with two concentric walls, even with in-text clarification of their asynchronous use, is misleading, a problem to which I myself have in the past regrettably contributed (Smith *et al.* 2014: 164-165).

It is evident that the combined issues of false homogeneity and misleading definitions of developmental histories of sites termed "Kranzhügel" require addressing, especially in any study of the GWJ. This has been noted by several academics, including Creekmore (2014), and Sébastien Rey (2013: 234-235), and was one of the major topics discussed at the 2013 international workshop "Origins, Structure, Development and Sociology of Circular Cities of Early Bronze Age Syria" held in Lyon (Quenet *et al.* [eds.] in press). Taking into account these issues, combined with the vastly differing manifestations of "Kranzhügel" sites on remote sensing data, it became apparent that more precise categorisations were necessary. Thus a typology of the appearance of "Kranzhügel"-like settlements on remote sensing was created for the GWJ, more precise and less constricted by previous assumptions based on that homogenous term. However, as the word has become engrained and synonymous with certain sites such as Tell Chuera, I have not attempted to eliminate it, but rather narrow its definition, and create new terms for sites that fall outside this. These are presented below.

3.6.3. Morphological Remote Sensing Typology Created for this Research

The morphological types described here were created during the remote sensing survey. Thus they could not be applied to identifications of sites made from the outset, but rather became apparent during the process of research. Instead, key properties of the morphologies of each two-tiered fortified tell site were noted, and later correlated and classified to enable the retroactive application one of the below categories to each. The definitions of these are drawn from those properties of the sites they encompass which are both distinguishing and shared by all. Nevertheless, some two-tiered fortified tells still defy categorisation due to their unique morphologies; thus an "other" category additionally exists. Two things should be emphasised about this classification system. Firstly, it is primarily meant to be applicable to the GWJ, and while it equally pertains to several sites beyond its borders, it is not specifically designed to be of use across the wider region[71]. Secondly, it is a typology of the appearance of sites on the remote sensing data used for this study, and does not necessarily reflect their morphology on the ground. Wherever possible, ground truth data has been used to moderate the apparent nature of these sites (and this is mentioned in-text below); however this was often not available. Thus the claims of the characteristics of the following site types should not, as a rule, be taken as postulations of their true forms.

3.6.3.1. *True Kranzhügel*

This type is a refined site category based on a strong similarity to Tell Chuera, created by narrowing down the transferable properties of that site to their essentials. The label *true Kranzhügel* distinguishes from the generic indiscriminate use of the word as discussed above, while still retaining the most widely-known term for these sites. Settlements in this category have three main features in common:

[71] For a more general classification encompassing all fortified Bronze Age sites in Northern Mesopotamia and the Levant, see Rey (2012: 185-194; 2013).

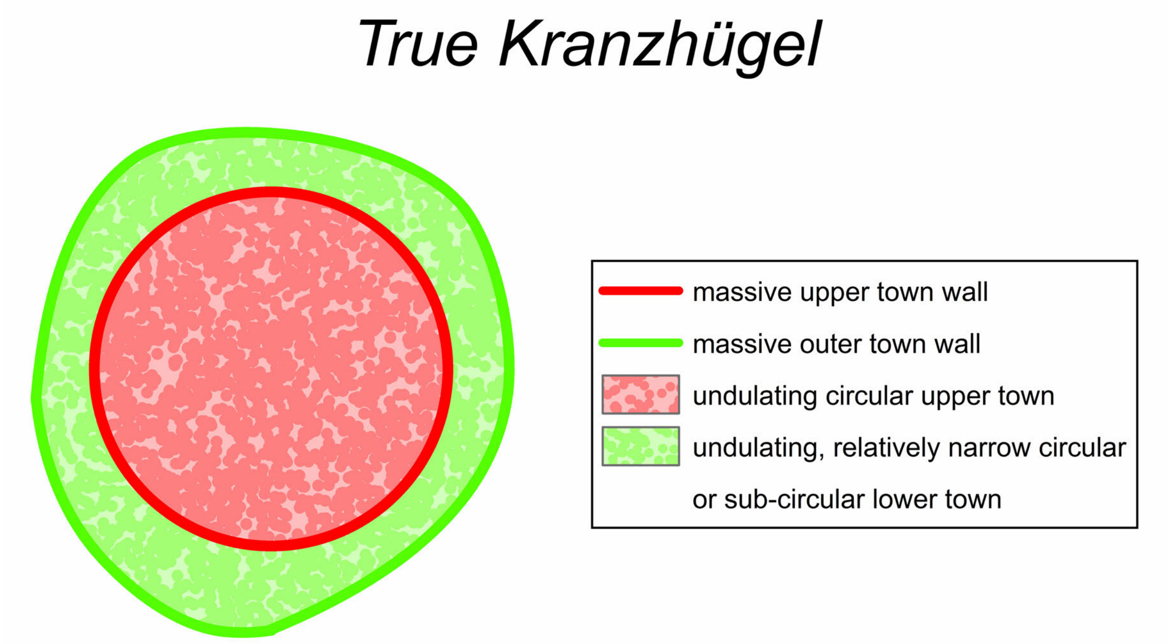


Figure 3.11: Simplified representative sketch of the core features that typify the appearance of a *true Kranzhügel* on remote sensing data.

a) a circular central flattened conical mound;

b) a massive inner wall;

c) a concentric definite lower town (with a clear undulating surface indicative of structures) on a clear lower terrace, at a level above the height of the surrounding landscape;

d) an outer wall equally or more massive than the inner one (Fig. 3.11).

The lower towns of these sites tend to be relatively narrow, with their width never comprising more than 55% of a site's total radius, with the average at 41%. Meanwhile, the course of the outer wall, and thus overall shape, of *true Kranzhügel* are not necessarily circular, though they are at least sub-circular rounded shapes, as opposed to polygonal (see Fig. 3.12b). Many of these features and their characteristics have been noted, by von Oppenheim as well as others, at numerous sites in this category, and all have been determined by excavation at Tell Chuera (see Fig. 3.5). The developmental history of Chuera's upper and lower towns, and inner and outer walls (see above) potentially applies to any site in this category, though this cannot be demonstrated without further ground control. Most of the previously-investigated two-tiered fortified tells in the GWJ fall into this category, including Tells Abu Shakhat, Khanzir, Mabtuh Sharqi, and Mabtuh Gharbi. They equate with van Liere and Lauffray's (1955) *Type III* (see Section 2.1.2.4).

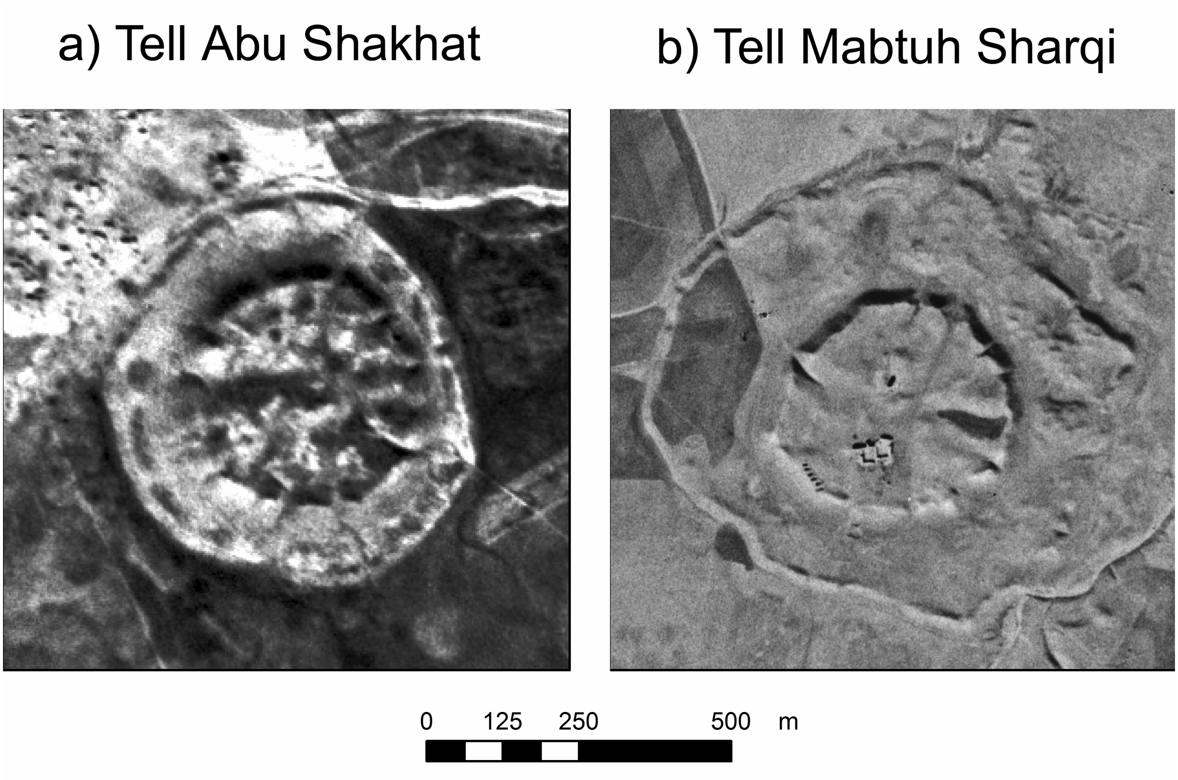


Figure 3.12: Examples of characteristic *true Kranzhügel* on CORONA satellite imagery.

3.6.3.2. *Ringwall Settlement*

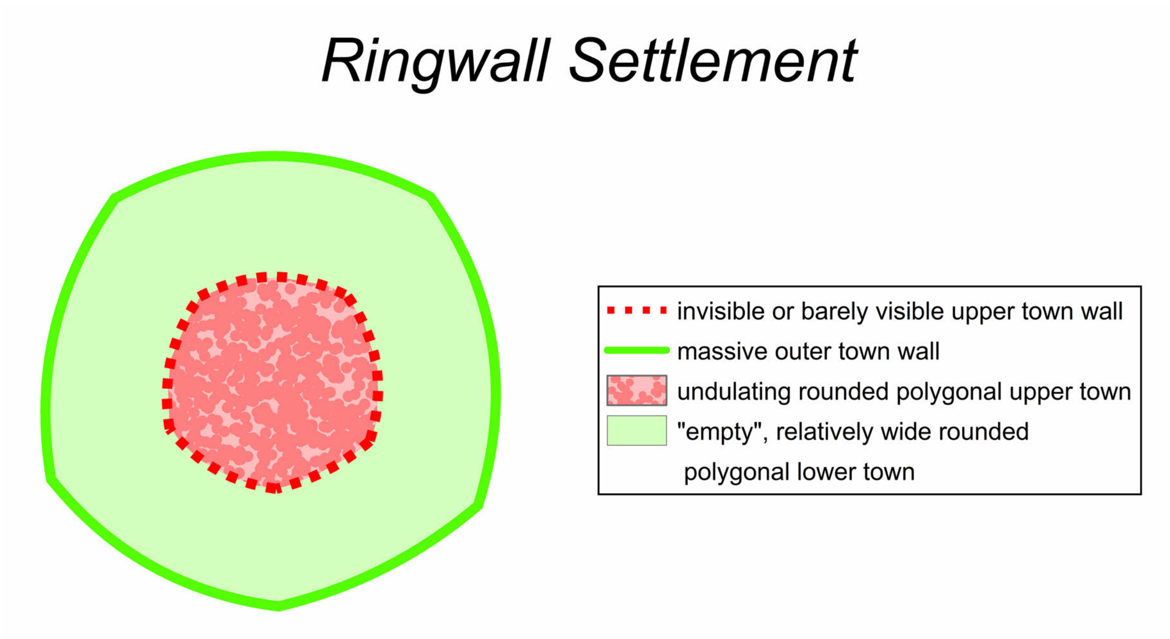


Figure 3.13: Simplified representative sketch of the core features that typify the appearance of a *ringwall settlement* on remote sensing data.

Sites of this category, named after their most prominent isolated feature, are typified in the GWJ by Khirbet Malhat and Tell Mu'azzar (Fig. 3.14), but are also represented by the better-investigated Tell Beydar. They are defined as comprising:

a) a circular or rounded polygonal central mound, appearing as a rounded truncated cone with a flat top;
b) a barely identifiable, sometimes seemingly nonexistent inner wall;
c) a concentric "lower town" area that is flat, generally featureless, and on an extremely low (if any) terrace;
d) a very clear massive outer wall, often with distinct gaps of city gates (Fig. 3.13).

Compared to *true Kranzhügel*, the lower towns of *ringwall settlements* are mostly relatively wider, with the broadest making up 63% of the total radius of a site, with 55% being the average. The outline shapes of the upper and lower towns are mostly complementary, and are largely rounded polygons, with examples of hexagonal, pentagonal, and square variations. This might be analogous with van Liere and Lauffray's (1955) *Type IIa* (see Section 2.1.2.4).

Excavations at Tell Beydar and site surveys at Khirbet Malhat indicate that despite being hardly visible on remote sensing data, most *ringwall settlements* probably did feature inner walls and occupation of their lower towns. At the former site, the inner wall is well documented, while lower town occupation lasted for only the first few centuries after the settlement's founding (Pruß 2013a: 134-135; see Section 3.6.2.2). At Khirbet Malhat, the

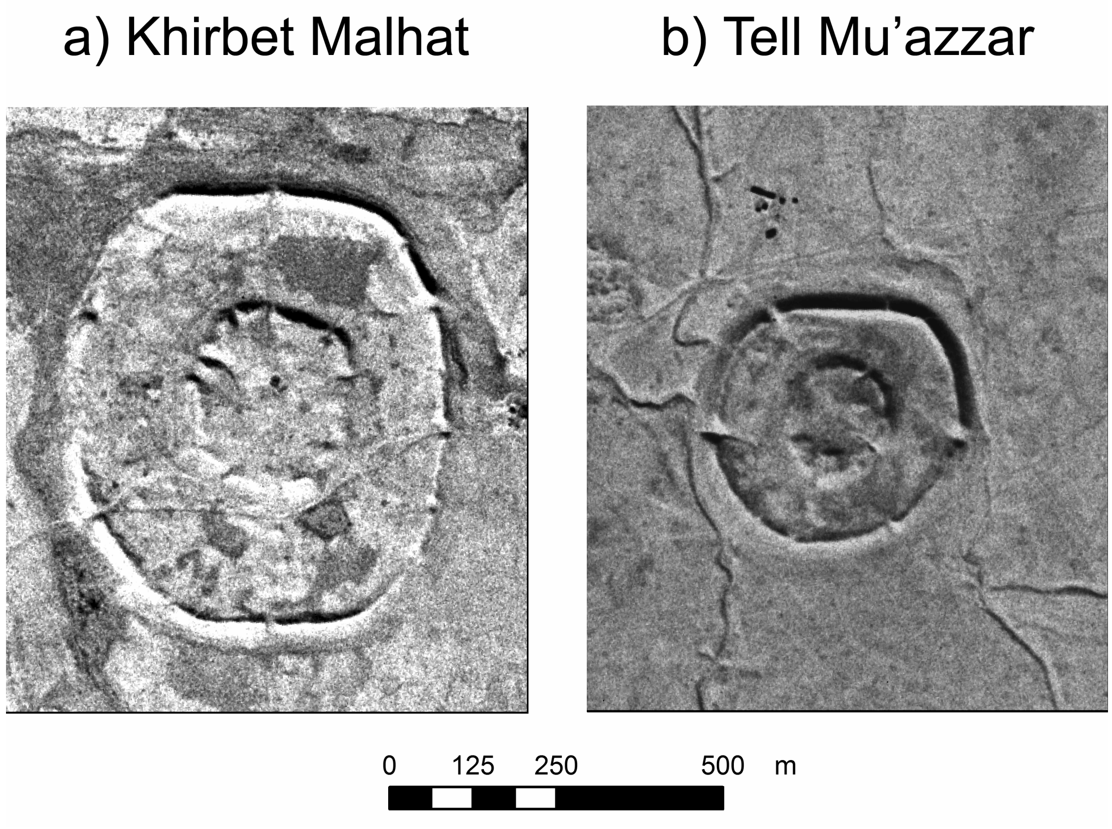


Figure 3.14: Examples of characteristic *ringwall settlements* on CORONA satellite imagery.

inner wall and lower town only became apparent after a geophysical survey was conducted, the latter of which was occupied from the mid-3rd millennium to the site's abandonment around 2300 BC (Quenet & Sultan 2014: 121-122; see Section 2.1.4.8). Thus both sites' lower towns have different developmental histories, yet share the fact that they were only occupied for a few centuries, explaining their apparent absence on satellite imagery. Therefore the only definite statement that can be made about the developmental histories of *ringwall settlements* in general is that their lower towns were inhabited briefly compared to their upper towns.

3.6.3.3. *Dakhliz-Variety* Tell

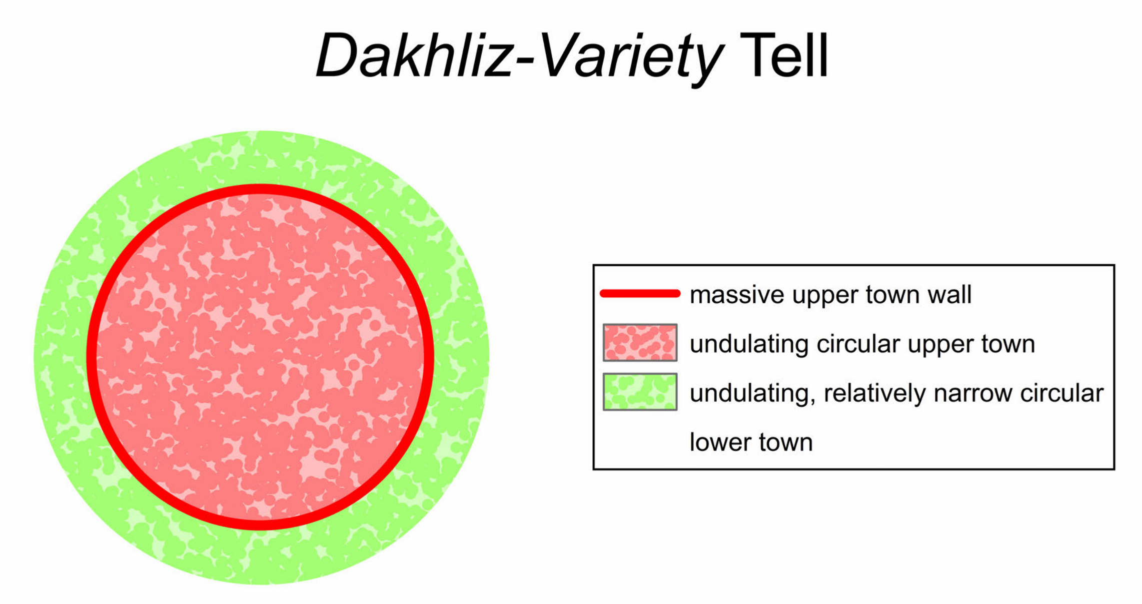


Figure 3.15: Simplified representative sketch of the core features that typify the appearance of a *Dakhliz-variety* tell site on remote sensing data.

These sites are typified by the eponymous Tell Dakhliz, as well as its less well investigated but nearly identical counterpart Tell Glai'a (Fig. 3.16). Their main characteristics are the following:

a) an upper town identical to that of a *true Kranzhügel* (flattened circular conical high mound with a massive surrounding wall);
b) a concentric circular lower town with a clear undulating surface on no clear terrace;
c) no traces of any outer wall enclosing the lower town (Fig. 3.15).

These morphological properties are based on data from an intensive site survey at Tell Dakhliz. It is of course feasible that an originally present outer wall is no longer visible by remote sensing, or even ground survey, due to past destruction, taphonomic processes, or modern land use, as is the case with the fortifications around "Ville II" of Mari, which was identified by a combination of excavation and geophysical survey (Butterlin 2010: 173-181; 2013: 260-262). Though this is a possibility that must be considered for *Dakhliz-variety* tells in general, it is almost certainly not the case at Tell Dakhliz itself. Despite heavy erosion on its eastern side due to a wadi, the ground survey found this site to be largely intact to the north, west, and south, with a clearly discernible upper town, single wall, and lower town, but no evidence for an outer wall, or indeed any topographic footprint thereof (Kudlek, pers. comm. 17/05/2014). The area occupied by these features was not found to be subject to particularly intensive modern land use, especially compared to, for example, the area around Tell Abu Shakhat, which nevertheless very clearly comprises two concentric walls (see Fig. 3.12a; Kudlek, pers. comm. 20/05/2015). Furthermore, the (low) intensity of farming that is evident at Tell Dakhliz does not vary between the area of the clearly visible "inner" wall and the area where an outer wall would be expected. Additionally, its lower town is clearly visible both on the ground and by remote sensing; thus it appears very unlikely that a more massive EBA structure in almost exactly the same place would have become completely invisible, while an extremely selective complete destruction of only the outer wall but not the outer town by any past

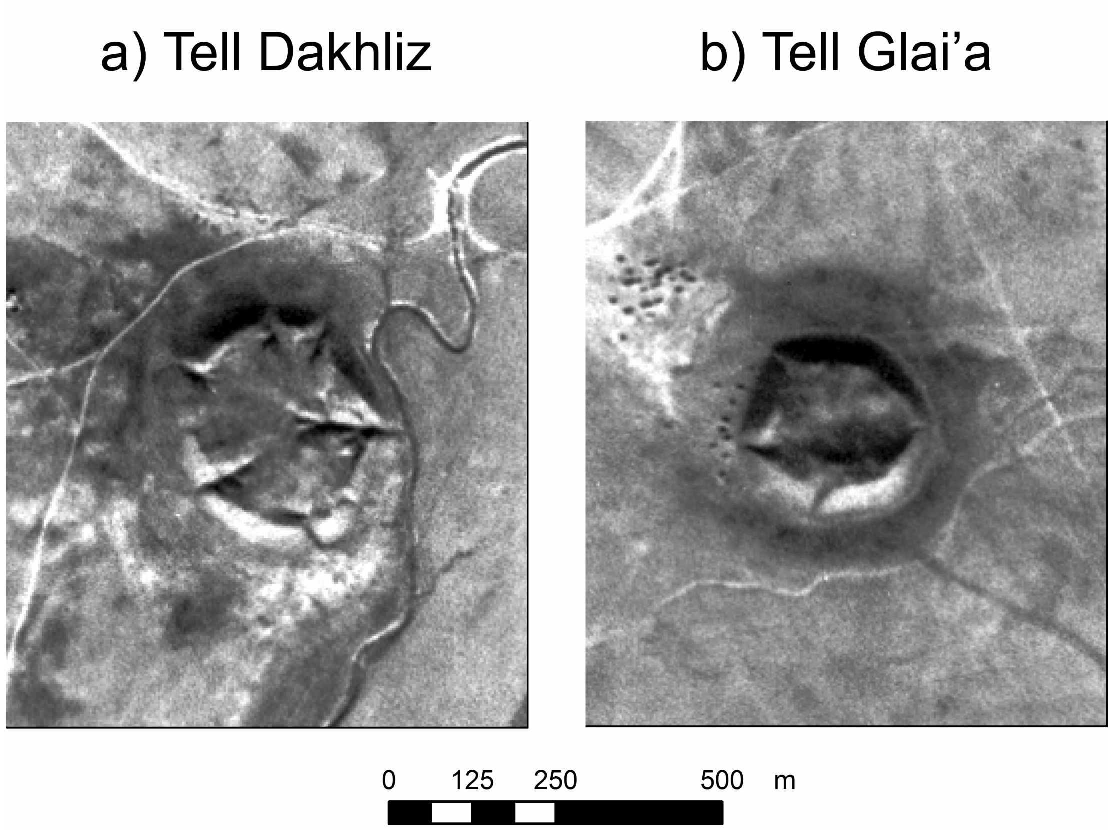


Figure 3.16: Examples of characteristic *Dakhliz-variety* tells on CORONA satellite imagery.

invading force seems equally improbable. Tell Dakhliz is therefore a testament to the fact that two-tiered fortified tells with lower towns *sans* fortifications did exist in the GWJ in at least one instance, and should therefore be considered a valid option for interpreting other sites that appear very similar on remote sensing.

Therefore I propose that such settlements are perhaps best explained as "unfinished" *true Kranzhügel*. That is to say they likely underwent the initial establishment of an ordinary tell with an enclosing wall as verified at Tell Chuera, subsequently expanding into a concentric lower town similarly also. However, they never saw the construction of an outer wall. This could either indicate a lack of necessity of constructing such a fortification, or, more likely, that the occupation of the lower town was short-lived. Further evidence for this latter explanation is that the lower towns of *Dakhliz-variety* tells appear relatively smaller than those of *true Kranzhügel*, comprising on average 34% of the width of each site's radius; in fact they fall within the lower half of the distribution of these percentages for *true Kranzhügel*.

3.6.3.4. *Matin-Variety* Tell

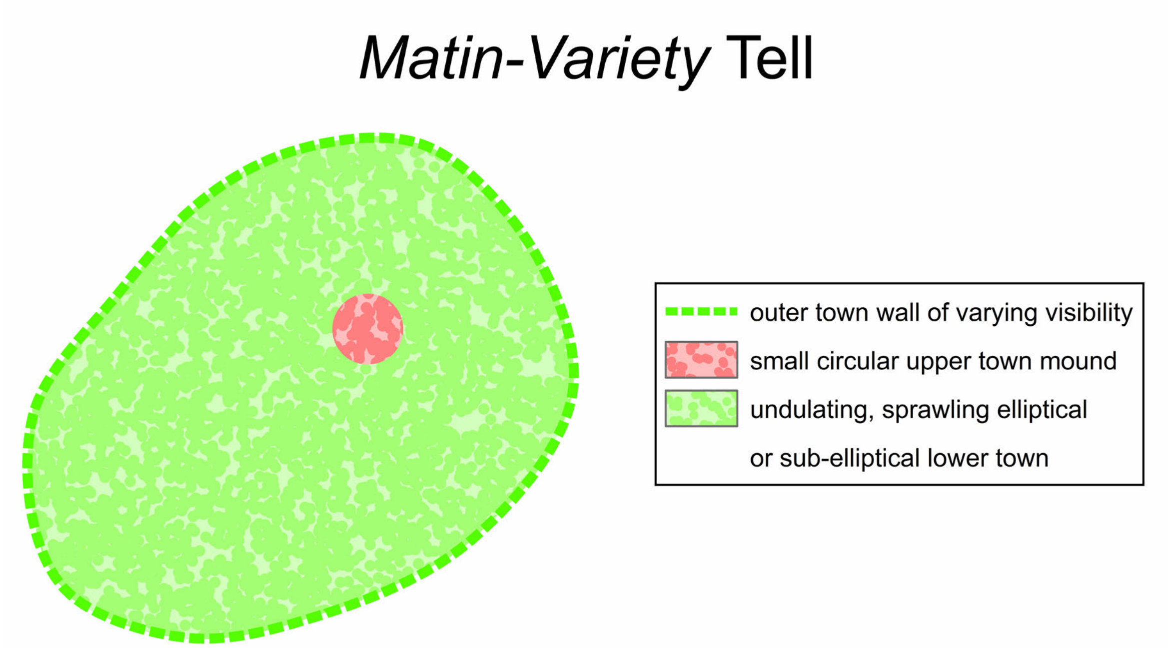


Figure 3.17: Simplified representative sketch of the core features that typify the appearance of a *Matin-variety* tell site on remote sensing data.

Sites in this category, the most prominent example of which is Tell Matin (Fig. 3.18a), are probably the least well-known of the two-tiered fortified tell types, with none having been studied in detail, let alone excavated. Their main characteristics are:

a) a small conical central or off-central high mound with no trace of an encircling wall;

b) a large, sprawling concentric lower town with a clear undulating surface on no clear terrace;
c) a surrounding lower town wall of varying clarity (Fig. 3.17).

The appearance of these sites is rendered particularly distinctive by the small size of the central mound (never measuring more than 2.3 ha) and the relative vastness of the lower town, comprising between 87% and 95% of the width of each site's radius. The lack of a clear "inner wall" may well not be an accurate reflection of the original morphology of these settlements, as the conical nature of their central mounds may itself be an indication of an original wall (see Lawrence 2012: 145-146). However, it is safe to say that these would not have been the massive ramparts found at other types of two-tiered fortified tells. The outer wall of *Matin-variety* tells is mostly only very faintly visible, though it sometimes shows up quite prominently (see Fig. 3.18b). Whether less substantial constructions compared to those at *true Kranzhügel* and *ringwall settlements* or geomorphological processes are responsible for this is unclear. The shape of this outer boundary varies, but is mostly either elliptical or sub-elliptical.

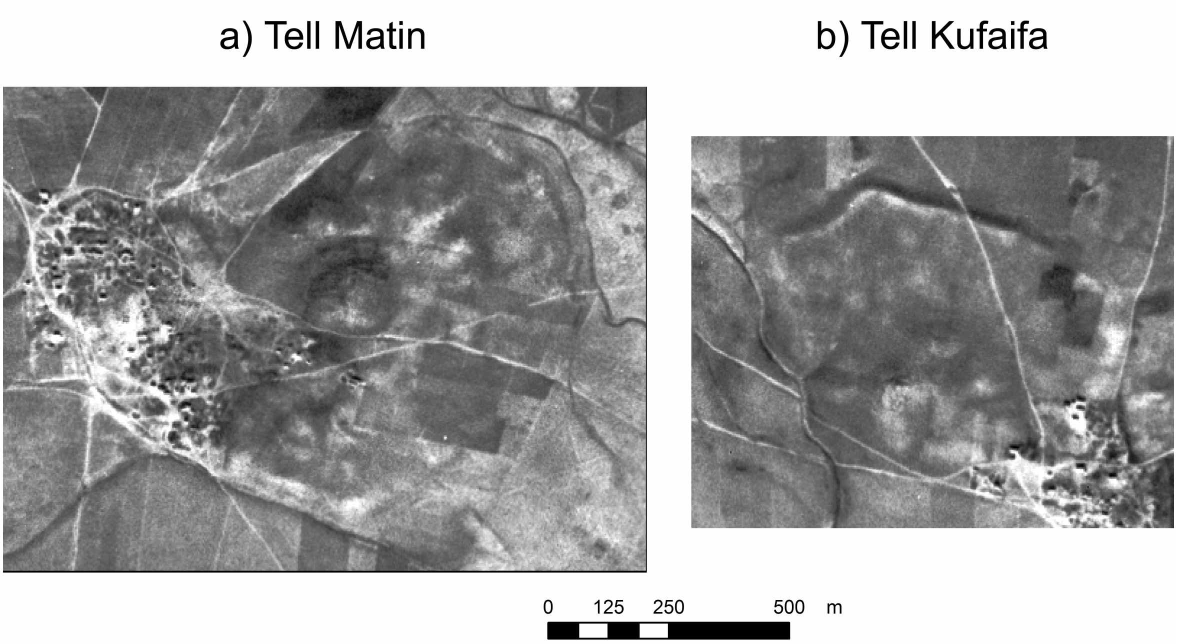


Figure 3.18: Examples of characteristic *Matin-variety* tells on CORONA satellite imagery.

3.6.3.5. Other Two-Tiered Fortified Tells

The above four types cover nearly 75% of the identified two-tiered fortified tells in the survey, however several settlements still defy classification. These are simply listed in an "other" category, as they are either unique, or more often similar to one of the above types but with enough differences to warrant exclusion. This was an especially important category to avoid false homogenisation of sites into pigeon-holed categories. Each of these sites has been described in a little more detail in the next chapter, with a morphological description and information on which (if any) of the four standard categories they most resemble and how they differ from them.

Section 3.7: Conclusion

The main focus of the research methodology described above was to allow for an accurate and precise analysis of the archaeological landscape of the GWJ. Through constant use of ground truth data to calibrate tentative feature identifications gleaned from remote sensing, the effects of the necessary reliance on the latter were greatly reduced. This enabled the issues arising from the potential for GIS to provide an overly functionalist macro-level perspective of archaeological landscapes (see Llobera 2012) to be largely, and often wholly, avoided by turning to interpretive results at every stage. Thus a methodology was created that simultaneously enabled an accurate assessment of the region of study as well as being of sufficient precision to allow comparisons with adjacent regions, despite many of those possessing a larger percentage of ground truth data.

Chapter 4
Selected Results of the Remote Sensing Survey in the Light of Ground Truth Data

Section 4.1: Chapter Layout

The results of this thesis' analysis are distilled from the full corpus of sources discussed in Chapter 3, and based on their entries in my geodatabase. While a comprehensive listing of all features from all time periods identified can be found in Table A.1, a subset of LC and/or EBA sites have been selected for detailed description here. These were primarily chosen based on whether they were used to illustrate points made in Chapters 2 and 5. Additionally, regardless of their mention elsewhere, all two-tiered fortified tells and tells with potential ramparts are included, as are any sites remarkable in some other way (such as containing LC material or having associated inter-site features). Features have been broken down into sections below based on the individual regions of the *Westjazira* Survey and Sweyhat Regional Reconnaissance, the Yale Khabur Survey, the Wadi Hamar Survey, and the unsurveyed region covered by remote sensing alone (Fig. 4.1).

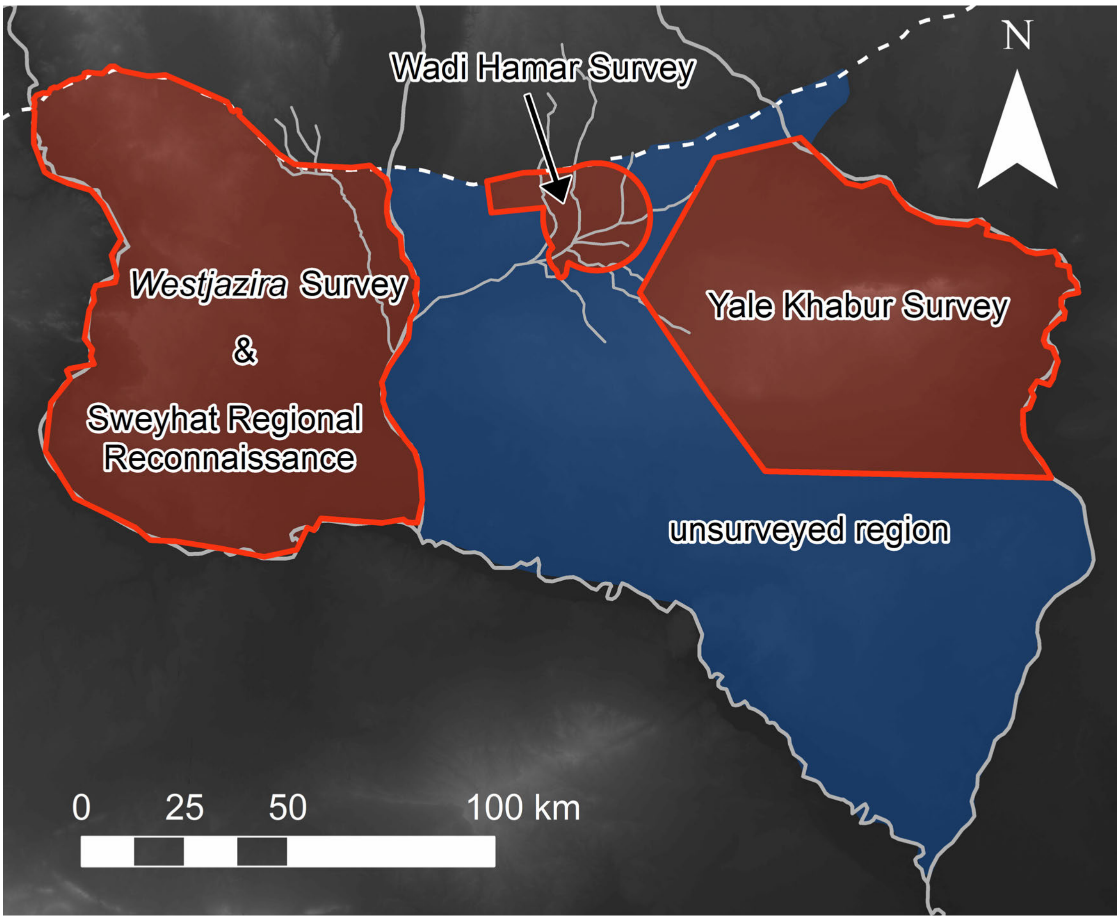


Figure 4.1: ASTER map showing the three surveyed areas and the unsurveyed parts of the Greater Western Jazira.

Basic evidence from these is presented on a feature-by-feature basis (arranged by feature type), with this thesis' own site numbering system and other salient points of each listed first. Unless otherwise indicated, all mentions of site sizes refer to measurements taken on CORONA imagery. Then follows a feature description with occasional elements of discussion. In the case of features recorded on remote sensing alone, this can include justifications of the identifications proposed; where sites have been visited on the ground, reports on their morphologies have, with few exceptions, been taken at face value. This description does not, as a rule, repeat data from the initial listing, however. Numbers in square brackets relate to annotations on the figures. At the end of this chapter, a brief combined presentation highlighting key distribution trends in the region leads into Chapter 5 and a general discussion.

Section 4.2: *Westjazira* Survey / Sweyhat Regional Reconnaissance Region

4.2.1. The Archaeological Landscape

Berthold Einwag's 1991-1992 *Survey in der Westjazira* covered the entirety of the ca. 8000-square kilometre region bordered by the Euphrates, Balikh, and Turkish border. However, all sites identified by the survey were located in the northern half of this region, and the vast majority (ca. 85%) clustered in the northernmost third. Michael Danti's 1996-1997 Sweyhat Regional Reconnaissance supplemented this with the identification of nine sites in the southern half of the area, as well as one further settlement in the north. However, the southernmost recorded site is still over 25 km north of the Euphrates. Identified sites of over 10 ha in size, meanwhile, are with only four exceptions located in the far northeast of the area, no more than 30km from the Balikh and 25km from the Turkish border (see Fig. 4.2).

The remote sensing investigations undertaken for this thesis have expanded on this picture significantly. Although a majority of sites (ca. 70%; 140 out of 178 sites) are still located in the northern half of the region, the settlement pattern is more evenly spread, with no areas of significant settlement clustering. Large sites are also no longer restricted to the northeastern section, though they largely remain within the northern two thirds of the area (Fig. 4.3).

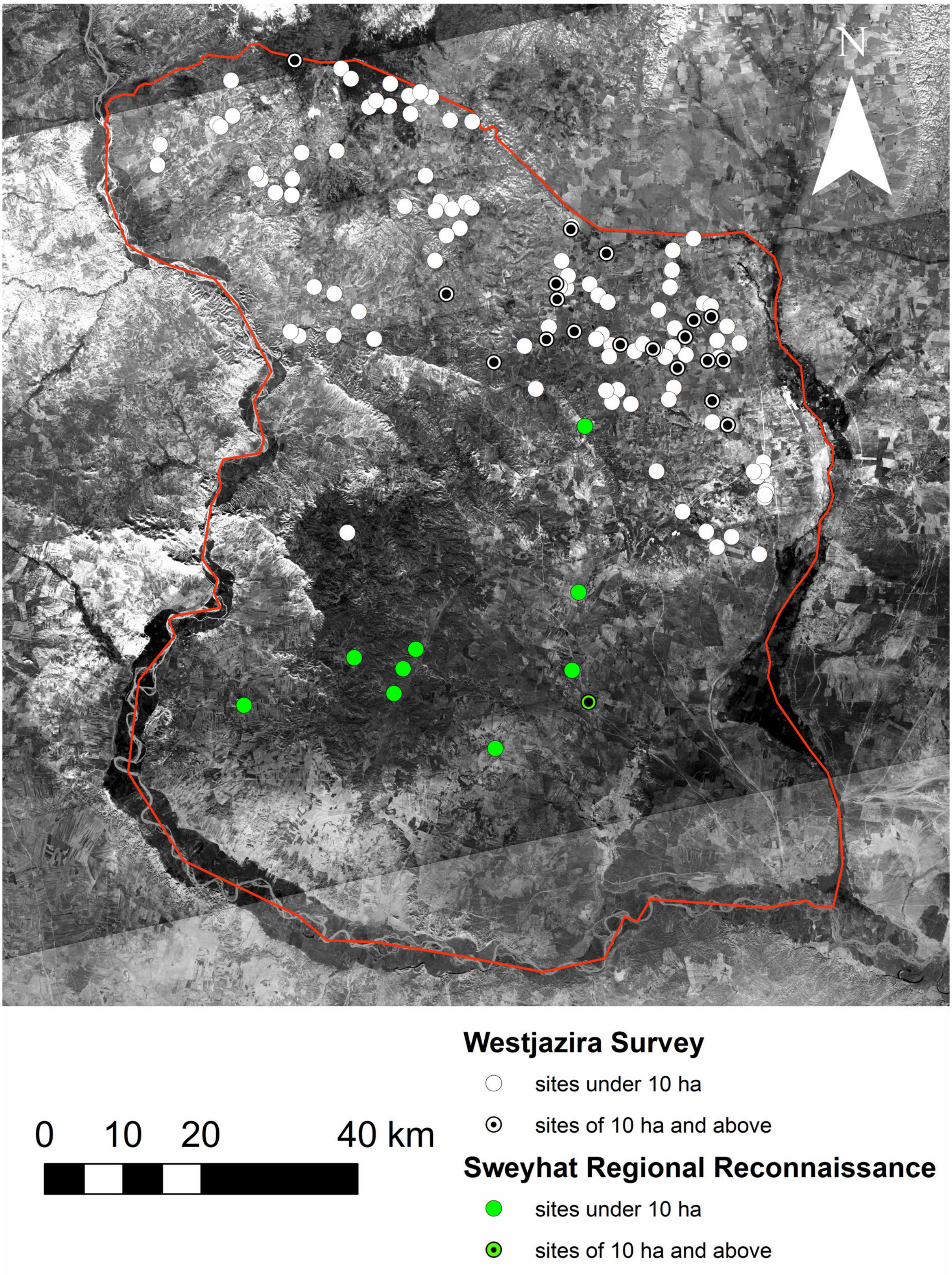


Figure 4.2: CORONA image (Mission 1038-2) of the *Westjazira* Survey / Sweyhat Reconnaissance showing all sites identified by the region's two ground surveys.

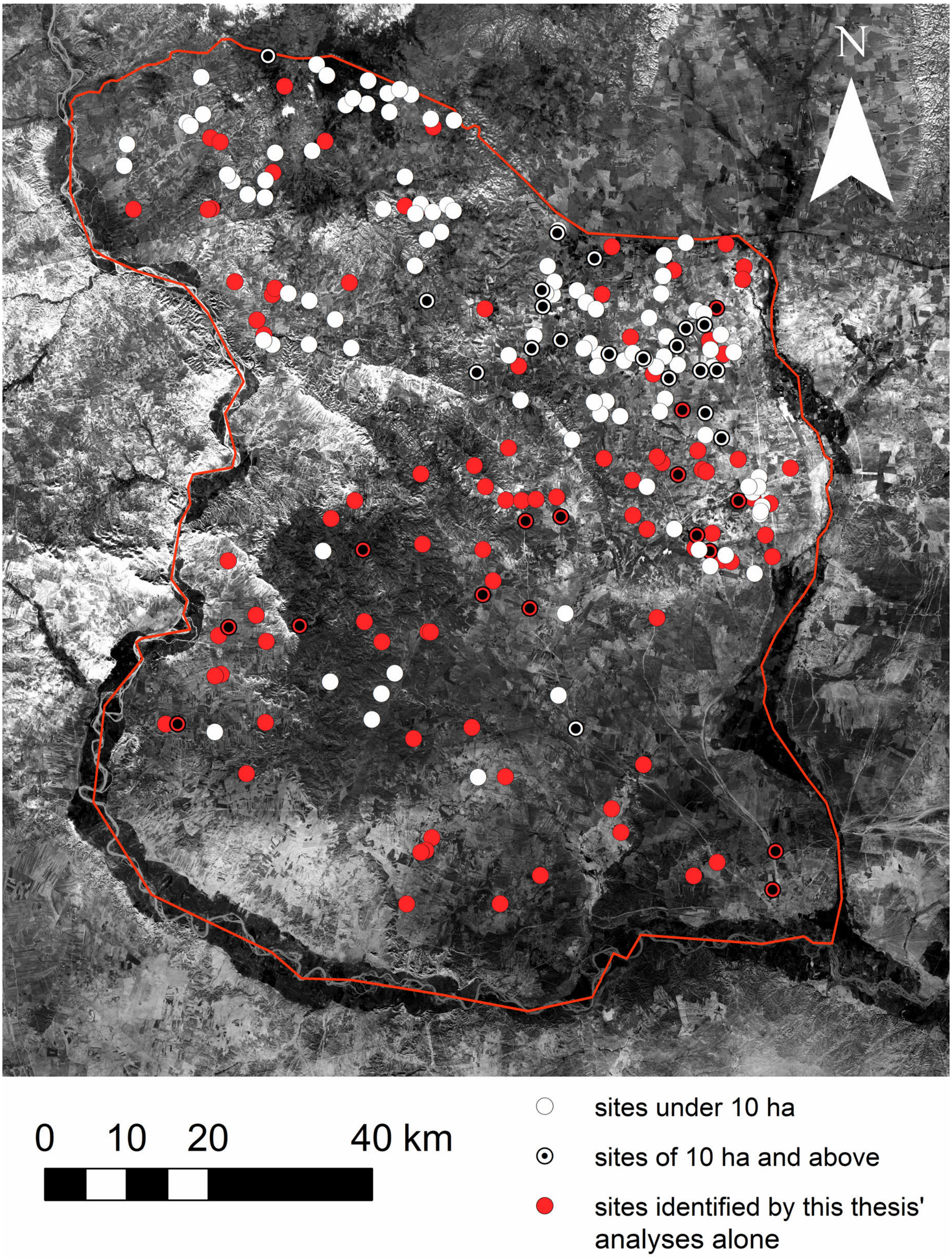


Figure 4.3: CORONA image of the *Westjazira* Survey / Sweyhat Reconnaissance showing all sites identified by both the ground surveys and the remote sensing survey.

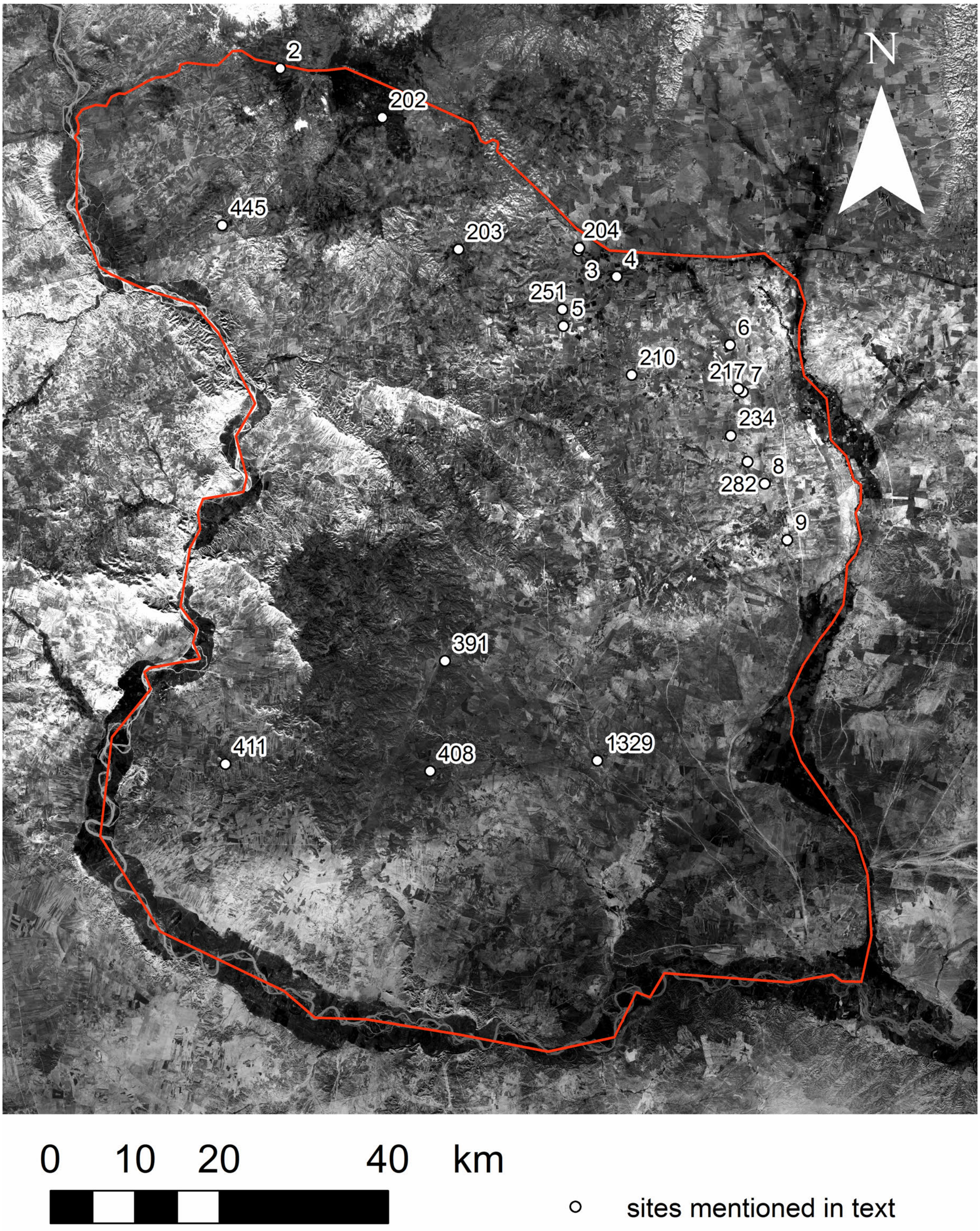


Figure 4.4: CORONA image of the *Westjazira* Survey / Sweyhat Reconnaissance showing all sites mentioned in text, by this thesis' numbering system.

4.2.2. Tell Sites

4.2.2.1. Two-Tiered Fortified Tells

Nine definite two-tiered fortified tell sites were identified in this area. Of these, six (including all of those over 10 hectares in size) are located in the densely occupied northeastern sector, while the further two are in the northwest and far south of the area, respectively. These settlements range from just over 1 ha to the largest at 63 ha, and comprise all of the four categories of two-tiered fortified tells, as well as one unique case.

Site 7 (Tell Barabra east)

Size: 26 ha

Morphology: sub-circular *true Kranzhügel* with no central depression

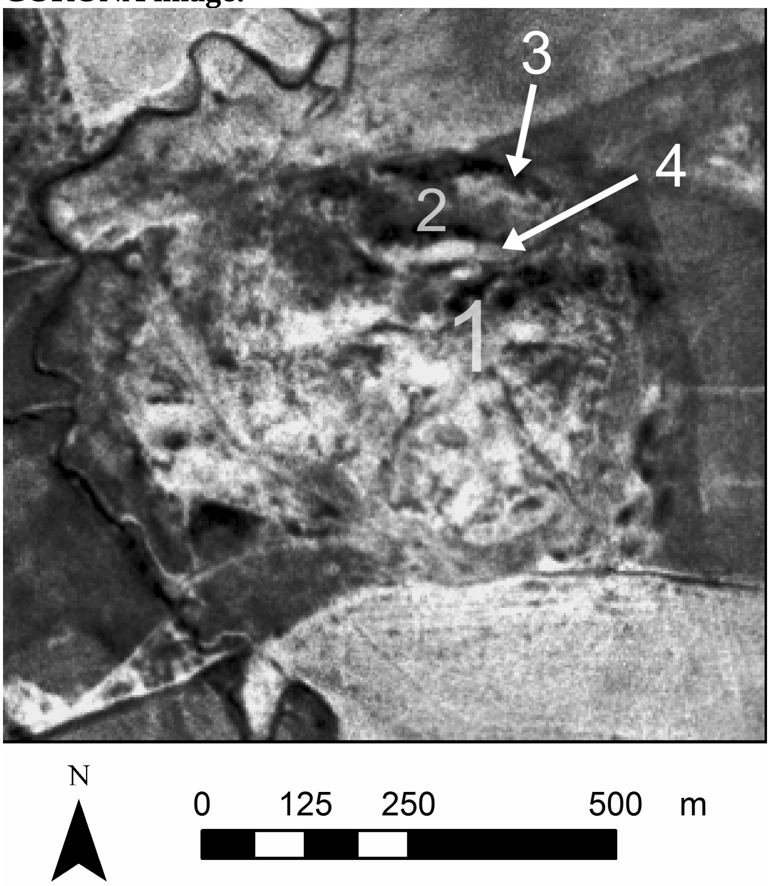
Visited in the field (reference): yes (Córdoba 1988; Einwag 1993, 2000; Fink raw data)

Occupation periods: Halaf, LC, EBA, MBA, LBA, Iron Age

LC occupation phases: not available

EBA occupation phases: not available

CORONA image:



Description: The only *true Kranzhügel* in this region, this site is located in the northeast of the surveyed area; a location that receives around 300 mm average annual rainfall, 8 km west of the Balikh river. It sits directly on the perennial Qaramukh river, only 1 km east of a confluence of a tributary watercourse. It appears on CORONA imagery as a very clear archaeological feature analogous to many large tells across the Balikh to the east; in particular, its shape and form resemble that of Tell Bogha (see Section 4.5.2.1). Its size easily matches that of many of the better-known “Kranzhügel” of the Wadi Hamar area, while its long occupational history includes some of the few LC remains found in the area. The central mound of Tell Barabra east [1] clearly shows evidence of weathering and rainwater run-off gulleys running radially outwards. This could be an indication of a radial road system (like that of Tell Chuera), with the anthropogenic depressions made for these hollowed out further by the elements. The concentric lower town [2], meanwhile, is fairly flat, yet clearly on a raised terrace above the surrounding landscape, an observation supported by its appearance on DEM. Around this, the outer town wall [3] is clearly visible. The inner wall [4] is less clear, with traces existing only at the northernmost edge of the upper town. A single hollow way appears to emanate from Tell Barabra east, leading to the south.

Site 408

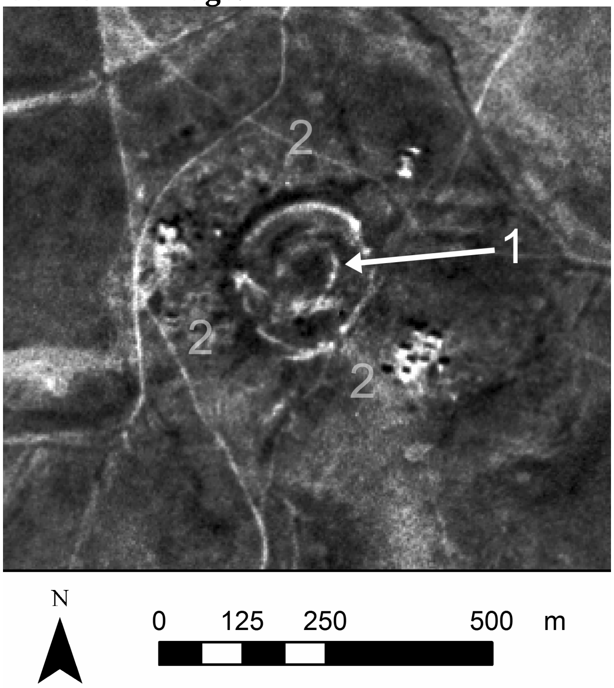
Size: 4.6 ha, possibly up to 20ha

Morphology: circular *ringwall settlement* with a central depression

Visited in the field: no

Occupation periods: not available

CORONA image:



Description: This settlement is located in the southern central section of the Balikh-Euphrates steppe, and represents a unique variety of *ringwall settlement*, showing a clear central mound and outer wall, and faint inner wall [1]. This area is devoid of any other fortified tells, and indeed fairly sparsely settled overall, no doubt in part due to its fairly low 250 mm annual precipitation. Around 30km from the nearest major river, the Euphrates, and over 40 km west of the Balikh, little correlation seems to be present between this site’s location and water sources; the nearest watercourse of any kind is over 4 km to its north as visible on CORONA. It is significantly smaller than all but one of the ringwall settlements in the Western Jazira, but clearly exhibits the major hallmarks of this site type. Beyond the site’s outer wall, a faint surrounding “halo” of slightly undulating surface [2] indicates possible human activity beyond the outer wall, extending to around 20 ha.

Site 5 (Tell Matin)

Size: 63 ha

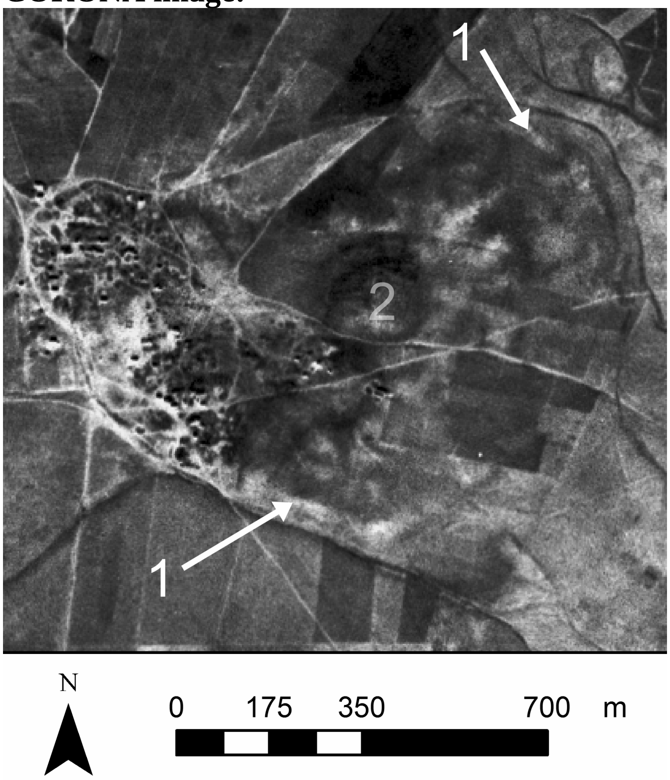
Morphology: sub-elliptical *Matin-variety* tell

Visited in the field (reference): yes (Einwag 1993, 2000; Fink raw data)

Occupation periods: EBA, Iron Age, Roman/Byzantine, Islamic era

EBA occupation phases: not available

CORONA image:



Description: One of the largest sites in the entire GWJ, Tell Matin is located directly on the boundary between the eastern-southeastern plains and the northwestern uplands of the Euphrates-Balikh area, in the vicinity of several minor watercourses. The site is an irregular elliptical settlement clearly identifiable both on satellite imagery and DEM data. Its encircling wall [1] is only partially visible on remote sensing data. However, Einwag's (1993: 35) ground truth confirmation of a "Stadtmauer" of *in situ* stone blocks, whose "*Verlauf … sich partiell verfolgen [lässt]*"[72] verifies this otherwise slight evidence. The entire lower town of Tell Matin shows up very clearly as a strongly undulating surface on CORONA imagery, again confirmed by the "*mehrere Hügel*" observed by Einwag. The entire site appears to have been occupied during the EBA, while the later remains are mostly restricted to specific sections; Roman/Byzantine ceramics in the westernmost part of the lower town, and pottery from the Islamic era on the very top of the central mound [2] (*ibidem*).

[72] "[course can be partially followed]"

Site 210 (Tell Kufaifa)

Size: 34 ha

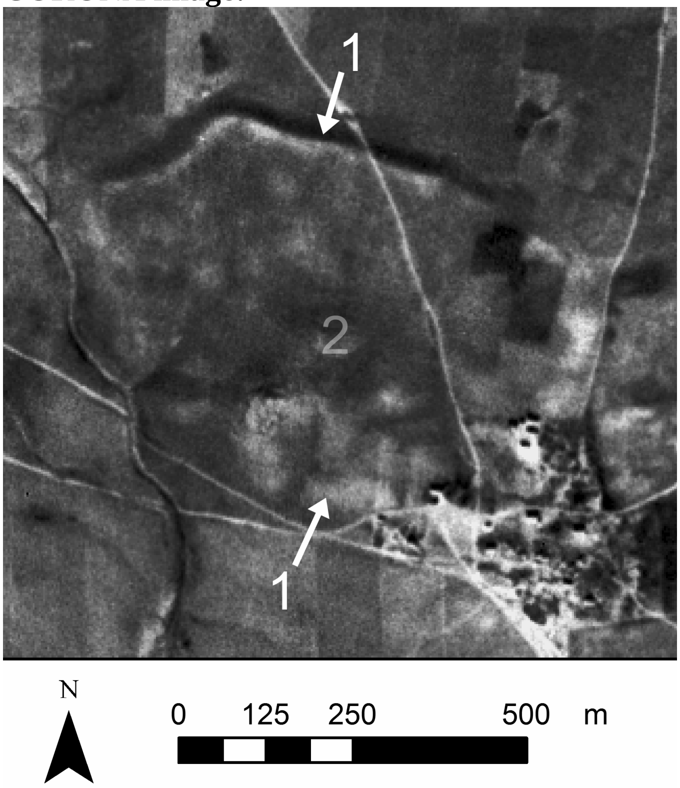
Morphology: sub-elliptical *Matin-variety* tell

Visited in the field (reference): yes (Einwag 1993; Fink raw data)

Occupation periods: EBA

EBA occupation phases: not available

CORONA image:



Description: Unusually for the northern Euphrates-Balikh steppe, Tell Kufaifa (also known as Kur Kahiya) was not re-occupied after the EBA (Einwag 1993: 34-35), meaning its features from that period are still clearly visible, both by remote sensing and on the ground. This site is located 10 km southeast of Tell Matin, well within the eastern lowlands that stretch down to the Balikh, 20km to the east. This site's surrounding wall is its most striking feature, very clearly visible along its northern and northwestern edge, and traceable along much of its eastern and southeastern extremities also [1]. This correlates with Einwag's (1993: 35) assertion that "*die umgebende Stadtmauer … sich als Wall im Gelände [abzeichnet]*"[73]. Its central mound [2], meanwhile, is fainter than average for a *Matin-variety* tell.

[73] "[the surrounding city wall appears as a rampart in the terrain]"

Site 4 (Koberlik)

Size: 25 ha

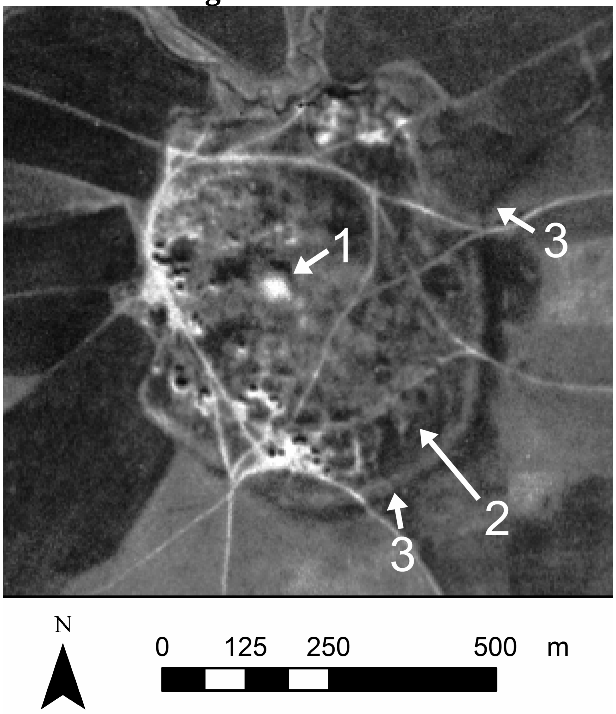
Morphology: elliptical *Matin-variety* tell

Visited in the field (reference): yes (Einwag 2000; Fink raw data)

Occupation periods: EBA, Iron Age

EBA occupation phases: not available

CORONA image:



Description: Koberlik features a very pronounced off-centre inner mound [1], around which stretches a characteristic undulating surface. A surrounding wall is only very faintly visible on satellite imagery, mainly in the settlement's southeastern quadrant [2]. Curving around the southern half of the site is what appears to be a derelict watercourse, which at its eastern extremity sharply curves away from the tell edge [3] to join the Qaramukh 1 km to the northeast. Its further western course, should one have existed, is not traceable. A handful of hollow ways extend to Koberlik's north, with one particularly long one extending northeast towards a site on the other side of the Turkish border.

Site 8

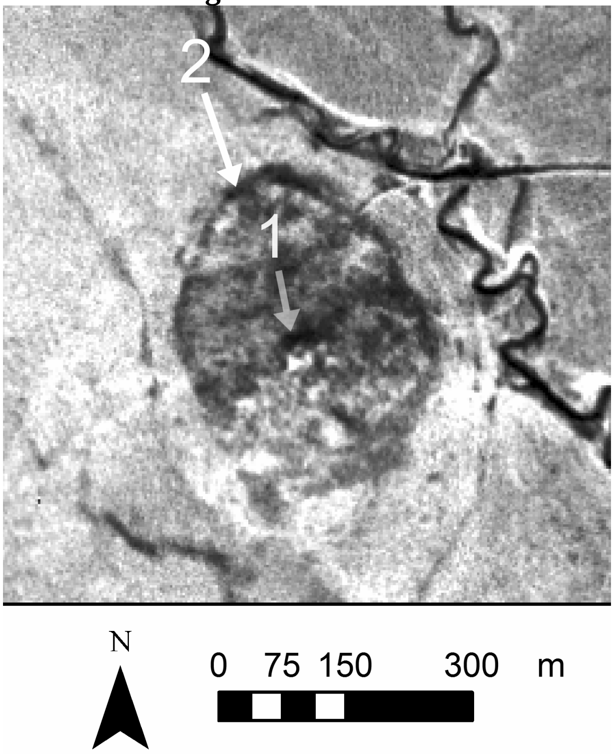
Size: 8.5 ha

Morphology: elliptical *Matin-variety* tell

Visited in the field: no

Occupation periods: not available

CORONA image:



Description: Site 8 is located on the Qaramukh and is clearly represented by an off-centre inner mound [1] surrounded by a sprawling lower town of strongly undulating surface. The town wall [2] is very pronounced, its course traceable on CORONA imagery around nearly the entire site (with the exception of its southwestern quadrant), and includes evidence for a distinct gap at its northernmost point, potentially a city gate. A few hollow ways pass close by Site 8, but none appear to emanate from it.

Site 2 (Tell Sha'ir [Sarugh])

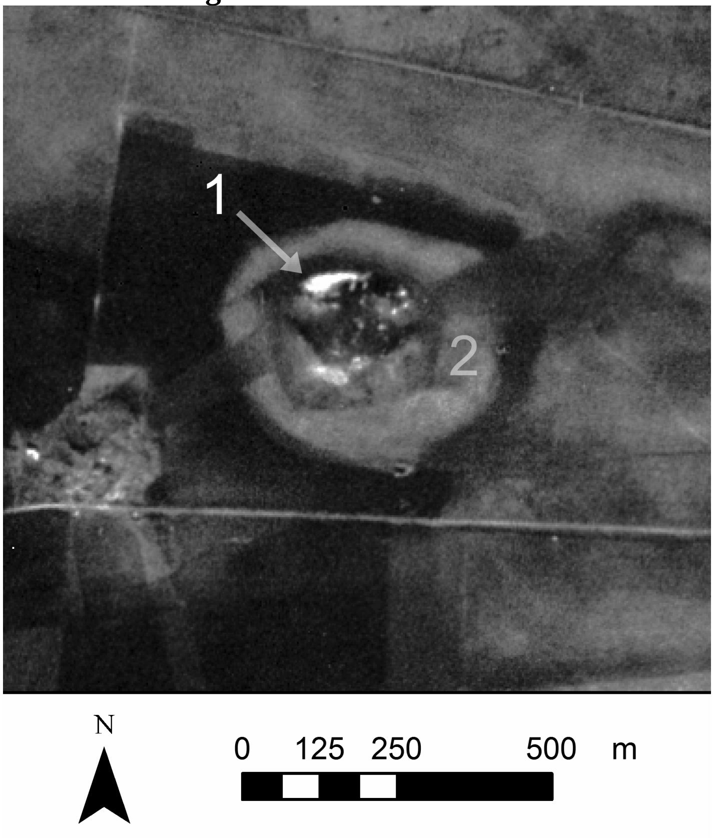
Size: 15 ha

Morphology: rounded polygonal *Dakhliz-variety* tell with a central depression

Visited in the field (reference): yes (Einwag 1993; Fink raw data)

Occupation periods: not available

CORONA image:



Description: Tell Sha'ir [Sarugh] is located in the northwestern survey area, directly adjacent to the Turkish border; situated within a small lowland area that cuts a triangle south into the Sarugh uplands. Its inner wall [1] appears to feature at least four gaps that could indicate town gates. Beyond this, a bright "halo" [2] spreads irregularly outwards.

Site 6 (Tell Marrak)

Size: 17 ha

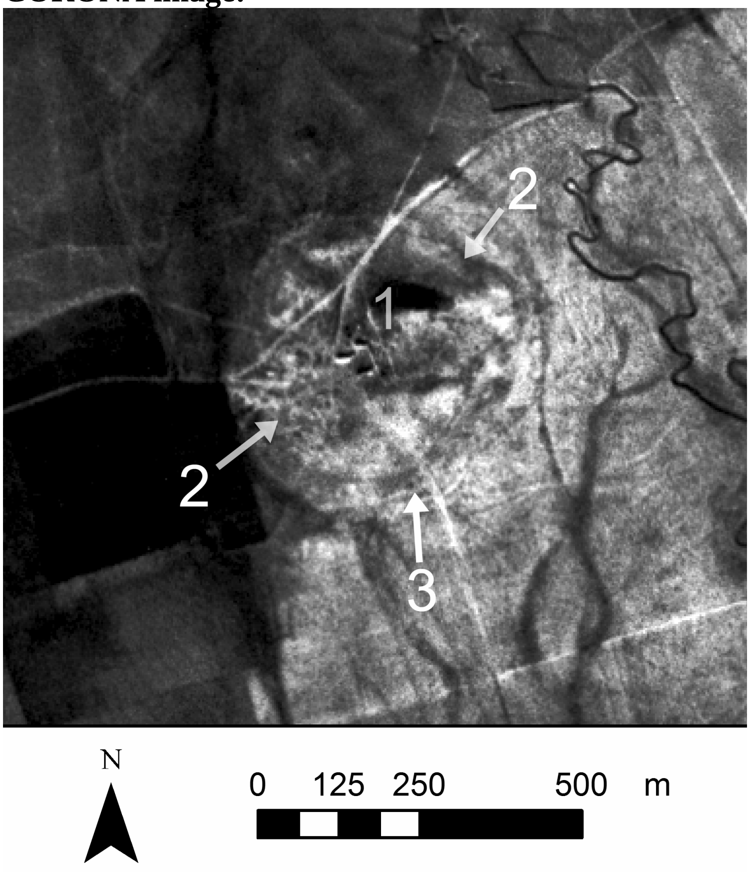
Morphology: circular *Dakhliz-variety* tell with a central peak

Visited in the field (reference): yes (Córdoba 1988; Hours *et al.* 1994)

Occupation periods: Halaf, EBA, MBA

EBA occupation phases: not available

CORONA image:



Description: Located in the northeastern part of the surveyed region, just under 6 km north of Tell Barabra east upstream along the Qaramukh, Tell Marrak features a very distinct small mound [1] located off-centre within its upper town. This highest point is eccentrically surrounded by a clear wall [2]. Beyond this lies a narrow concentric lower town [3].

Site 445

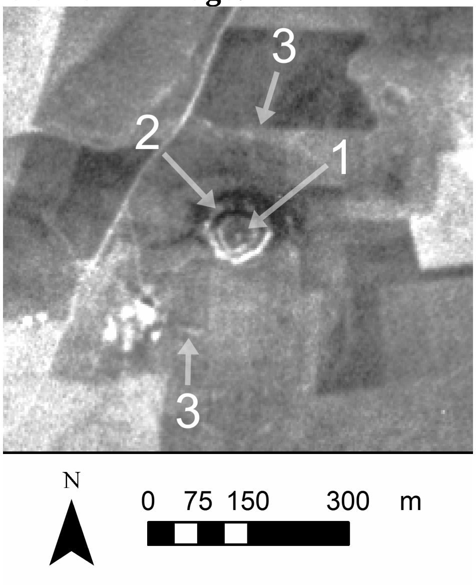
Size: 1 ha, possibly up to 8 ha

Morphology: small two-tiered fortified site

Visited in the field: no

Occupation periods: not available

CORONA image:



Description: The final variety of two-tiered fortified site located in the region of the *Westjazira* Survey is, as far as this investigation can tell, one of only two in the GWJ, the other being Tell Jerwa in the southern Western Jazira (Section 4.5.2.1). Site 445 appears as a small, roughly circular double-walled feature located in the northeastern uplands of the survey area, at an altitude of around 450 metres above sea level (roughly 100 metres above the altitude of all abovementioned sites). It is the smallest two-tiered fortified site identified by this analysis. The inner, upper part of this site of 0.35 hectares is a somewhat irregular circle, with evidence of a circular feature no more than 15 metres in diameter at its centre [1]. Around this, an even more irregular circular lower part extends outwards by between 10 and 25 metres [2]. Surrounding the inner part of the site is a distinct wall, while that surrounding the outer part is less clear, but still faintly traceable. Gulleys gouged out by run-off extend from the lower part of Site 445, flowing radially outwards. An extremely faint dark "halo" (edges marked with [3]) surrounds the entire site to a size of 8 hectares; this, however, may be natural in origin. The entire site appears more as a double-walled enclosure, rather than a settlement of constituent upper and lower parts; indeed I am hesitant to describe it as a site at all, though it resembles the appearance of an ancient mound on four separate CORONA Missions and, as evidenced by DEM, its centre is raised above the surroundings. This topography is also visible on recent GeoEye images, though as this area is now covered by modern buildings, its morphology is impossible to make out.

4.2.2.2. Other Tells

Other tell settlements are found across this entire region, but in significantly fewer numbers in its southern half. A total of 109 probable and definite ordinary tells were identified, ranging from around a quarter of a hectare to 10 hectares in size. These consist of a range of conical, truncated, circular, elliptical, and irregular forms and shapes. Just over half of these were visited in the field by Einwag, and 15 were described in his preliminary report. Ten were visited by Danti, who also described five further tells not identifiable on satellite imagery.

Site 3 (Tell Bandar Khan)

Size: 10 ha

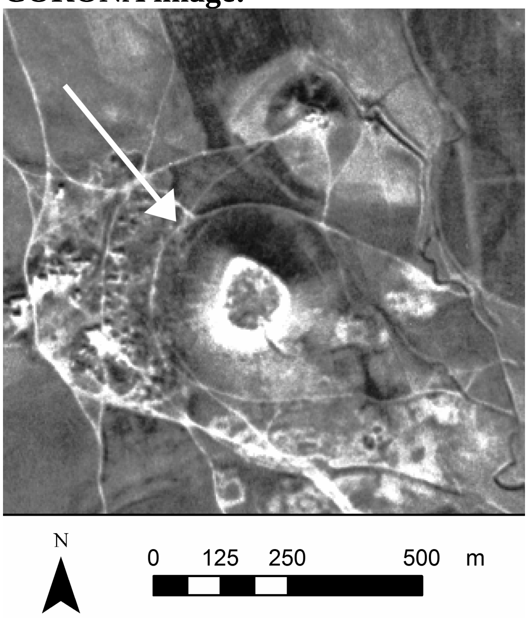
Morphology: circular truncated conical tell

Visited in the field (reference): yes (Einwag 1993, 2000; Fink raw data)

Occupation periods: EBA, MBA, Iron Age, Roman/Byzantine, Islamic era

EBA occupation phases: not available

CORONA image:



Description: Located close to the Turkish border, this site is situated on the Qaramukh around 5 km east of the Sarugh uplands. It clearly appears as a high circular truncated cone both on satellite imagery and on the ground (Einwag 1993: 37). A handful of very faint hollow ways emanate from Tell Bandar Khan in all directions.

Site 204 (Tell Bandar Khan north)

Size: 2.6 ha

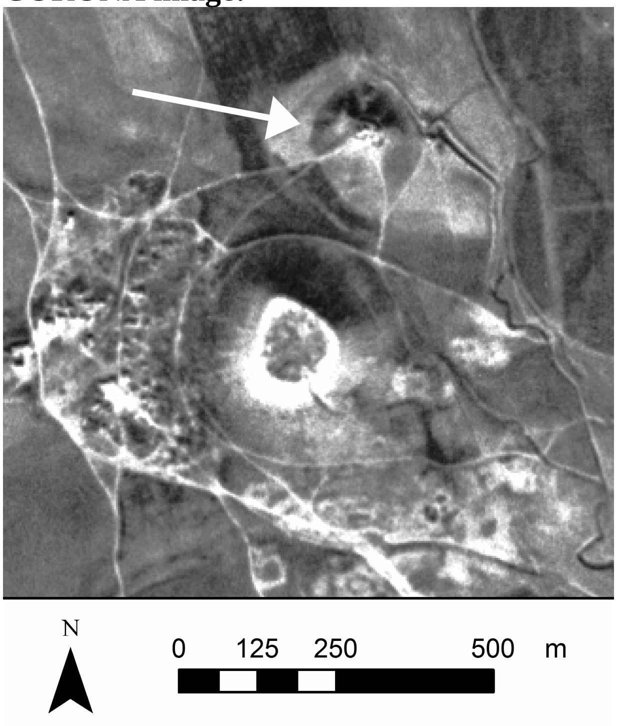
Morphology: sub-conical tell

Visited in the field (reference): yes (Einwag 1993; Fink raw data)

Occupation periods: Halaf, EBA

EBA occupation phases: not available

CORONA image:



Description: Situated a mere 100 metres to the northeast of Tell Bandar Khan, this settlement is one of the most prominent Halaf sites in the survey region. The few Halaf sherds found at Tell Bandar Khan were attributed to have been brought from this site. The very close proximity of these two sites during the EBA indicates that the 15-metre high Tell Bandar Khan north was possibly not primarily a settlement during this time, but perhaps performed a ritual or mortuary function such as the “White Monument” by Tell Banat (see McClellan 1998).

Site 203 (Boz Höyük tahtani)

Size: 6.8 ha

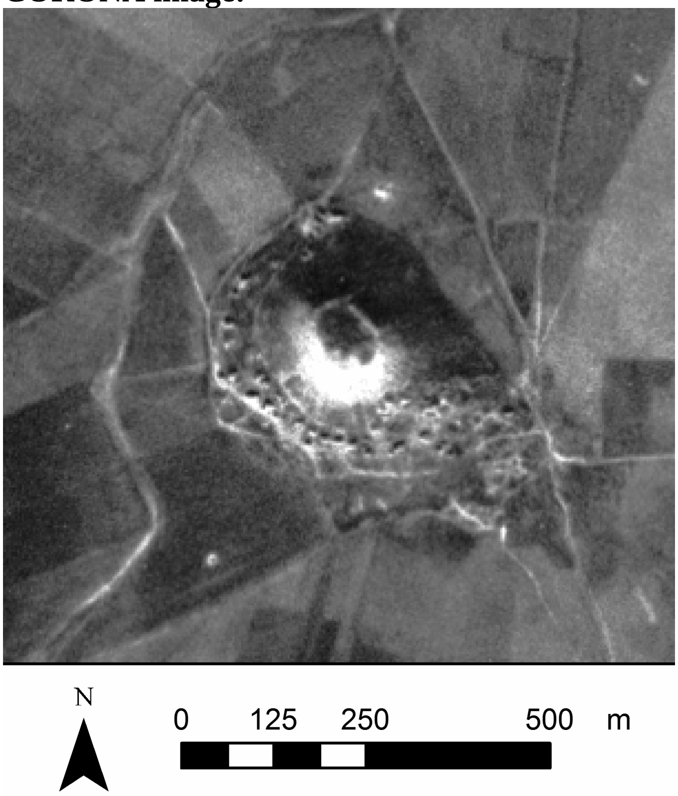
Morphology: circular truncated conical tell

Visited in the field (reference): yes (Einwag 1993, 2000)

Occupation periods: EBA, Iron Age

EBA occupation phases: not available

CORONA image:



Description: This tell is located in close proximity to the Sarugh uplands, 15 km west of Tell Bandar Khan. It looks strikingly identical to that site on CORONA imagery.

Site 202 (Tell Hajib)

Size: 5.2 ha, possibly up to 50 ha

Morphology: elliptical truncated conical tell

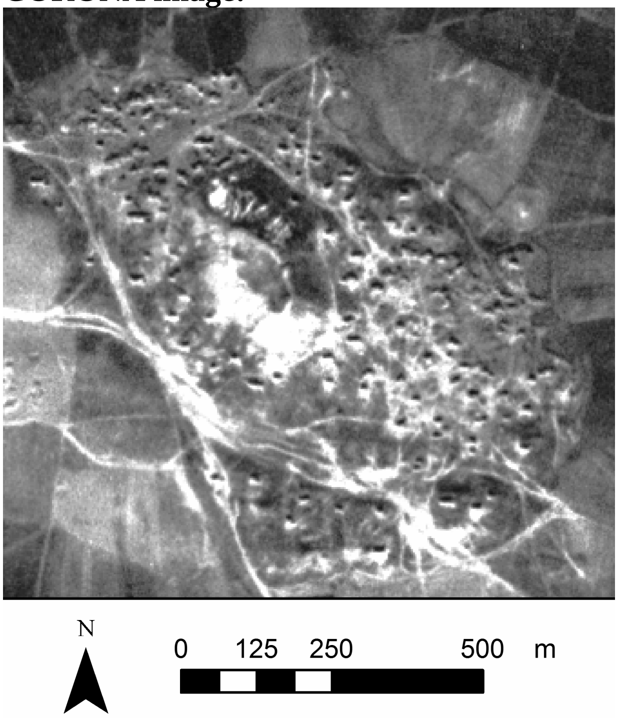
Visited in the field (reference): yes (Einwag 1993, 2000; Fink raw data)

Occupation periods: Halaf, Ubaid, LC, EBA, MBA, Iron Age, Roman/Byzantine, Islamic era

LC occupation phases: at least LC 4-5

EBA occupation phases: at least EJZ 3b-5

CORONA image:



Description: Close to the Sarugh uplands, some 28 km northwest of Tell Bandar Khan, this settlement has a long occupational history and is the only major site in the region to contain material explicitly from the Uruk expansion, with evidence in the form of bevel-rimmed bowls (Einwag 1993: 34). Its steep elliptical mound is surrounded by a further "pockmarked" surface indicating human activity, which potentially increases its estimated size to nearly 50 ha. Clearly significant during the EBA, the site was also of importance during the Iron Age, as evidenced by the discovery of several Neo-Assyrian stone reliefs (*ibidem*: 39).

Site 9 (Tell Fatsa)

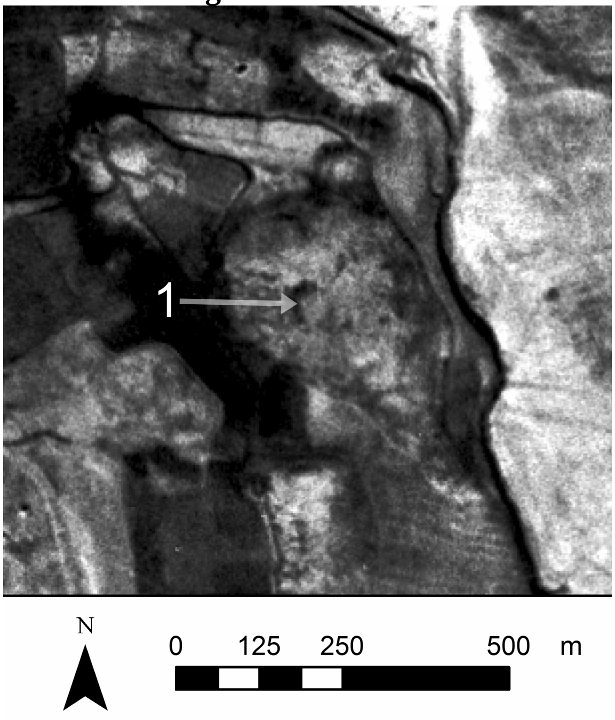
Size: 6.7 ha

Morphology: elliptical mounded tell with an off-centre high point

Visited in the field (reference): yes (Einwag 1993)[74]

Occupation periods: not available

CORONA image:



Description: Located on the banks of the Qaramukh a mere 9 km west of the Balikh, this is a site of interesting appearance on satellite imagery. Its features superficially suggest it belongs to the *Matin variety* category, with a central rise of 0.4 ha [1] surrounded by an undulating surface. However, as well as the central mound being too faint to definitively identify, there is no evidence of any fortifications around the "lower town" on any remote sensing data.

[74] Though note that Einwag's (1993: 30) mention of a flat site with the toponym "Fatsa" actually refers to Site 209 (Tell Fatsa east), 800 metres to the northeast of this site.

Site 391

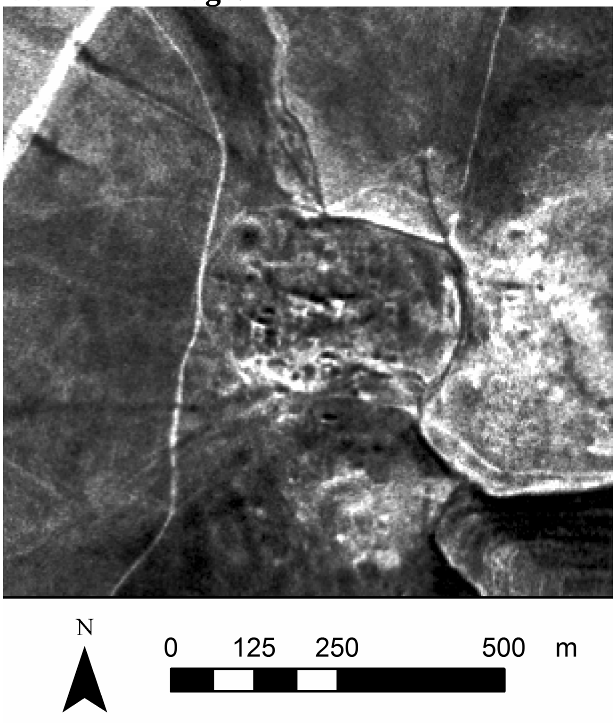
Size: 6.6 ha

Morphology: elliptical low tell

Visited in the field: no

Occupation periods: not available

CORONA image:



Description: Site 391 is primarily of interest due to its location and surrounding features. The site itself is of undulating surface with several mounded high points and structures visible within it on satellite imagery. It is situated on the eastern edge of a valley, 2 km wide at its maximum, which cuts through the uplands in the southwest of the Euphrates-Balikh steppe in a southwest to northeast axis. This route through a mountainous terrain remains a thoroughfare with a major road to the present day, and it is reasonable to assume the same was the case in ancient times. As well as its location along a probable routeway, and in an area largely devoid of other tell sites, the existence of clear hollow ways make this site significant.

Site 1329 (Joub al-Shayir)

Size: 10 ha

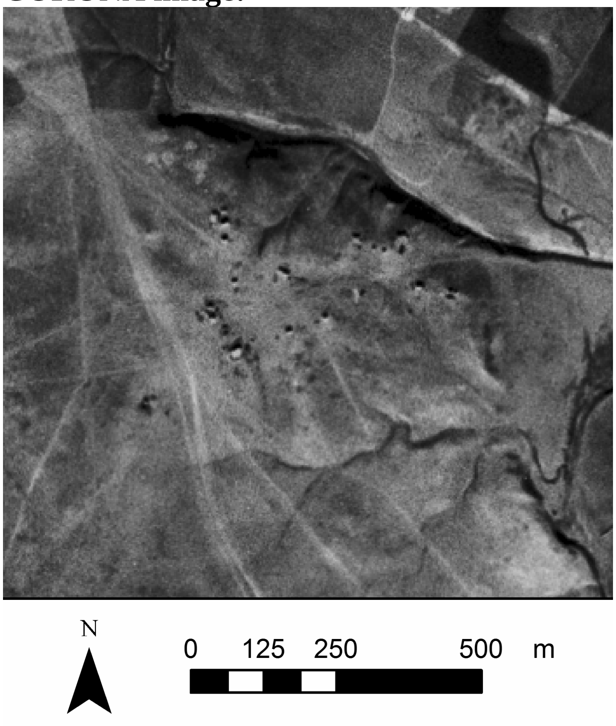
Morphology: conglomeration of small circular mounds

Visited in the field (reference): yes (Danti 2000)

Occupation periods: mid-late EBA

EBA occupation phases: not available

CORONA image:



Description: The largest tell in the southern area of the survey region, this is a sprawling site located 20 km west of the Balikh and 26 km north of the Euphrates. It is situated adjacent to the Wadi el-Fayyed, which runs south to eventually join the Euphrates. Located on a high rocky outcrop, it is visible as a series of small circular hillocks on CORONA imagery, an observation also made by Danti (2000: 276) on the ground.

Site 217 (Tell Barabra northwest)

Size: 3.3 ha

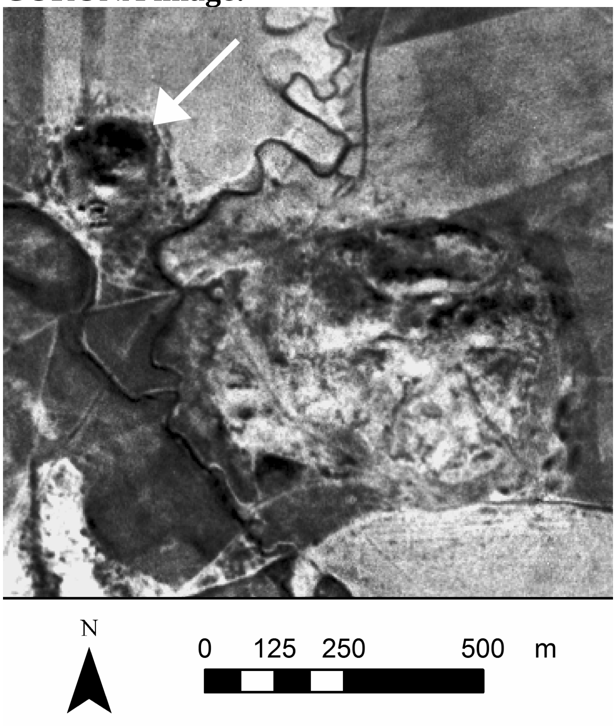
Morphology: elliptical tell with a central peak

Visited in the field (reference): yes (Einwag 1993; Fink raw data)

Occupation periods: EBA

EBA occupation phases: not available

CORONA image:



Description: This site is of interest primarily due to its location around 500 metres from Tell Barabra east on the opposite bank of the Qaramukh. Such a close “satellite settlement” is unusual for double-walled tell sites, and may be best explained by the two sites’ relative locations, flanking either side of the river. Alternatively, a ritual or mortuary function as suggested for Tell Bandar Khan north (see above) may provide an explanation.

4.2.2.3. Combined Overview of Tell Sites

The overall high number of tell sites in this area indicates a large-scale occupation during the EBA, something also noted by Einwag (1993: 34; see Fig. 4.21). Though ordinary tells are mostly analogous with those in the Western Jazira, the two-tiered fortified tells of this region present a more singular picture. With only one site each representing *true Kranzhügel* and *ringwall settlements*, the majority are of the *Matin variety*, a type only represented by two other sites outside the Euphrates-Balikh steppe. Meanwhile, the tiny double-walled Site 445 is an enigma. Further similarities to the

Western Jazira can be found in the even distribution of normal tells compared with the regional clustering of two-tiered fortified ones, in this case mainly in the Balikh-Qaramukh region to the northeast. The majority of two-tiered fortified tells, and nearly all those in the northeastern area, are large (over 10 ha in size), while only four (ca. 4%) ordinary tells are.

4.2.3. Flat Settlements

Fewer flat settlements than tell sites were identified in this area (see Fig. 4.21). A total of 48 sites of this type could be recognised, the majority of which are located in the central third of the Euphrates-Balikh steppe. These range from towns of over 100 hectares to single isolated buildings no more than 30 by 30 metres in size. With one exception (Site 206; Tell Muhra lower town; Halaf period; Einwag 1993: 30-31), none of these features contain any evidence to suggest they predate or date to the periods covered by this thesis. Based on their morphologies of large square structures, a Byzantine or Islamic-era date is a reasonable assumption for the majority.

4.2.4. Other Sites

A further 11 sites are identified on Einwag's (1993: Abb. 4) map which are not visible, or very unclear, on satellite imagery. Unfortunately, these sites are not described by Einwag either, and thus no further ground truth information can be gleaned about them. Most appear to be either indistinct flat settlements or mounded sites completely flattened by modern settlement. One site, Tell Medliq (Site 240), located in the northeast of the survey area, can be assumed to be a tell settlement by mere virtue of its toponym. The Sweyhat Reconnaissance additionally makes mention of sites such as pastoral camps, "pastoral emplacements", and tombs (Danti 2000: 271-272), equally invisible on remote sensing data. However, it can be categorically stated that these were all located in the southern half of the region. Further data from the field visits conducted would be required to be able to say anything more definitive about these features.

4.2.5. Inter-Site Features

4.2.5.1. Hollow Ways

The vast majority of hollow ways in this area are located in its far northeastern sector (see Fig. 4.22), though they are few and mostly faint.

Hollow Way Network 1

Associated Sites: Site 234, Site 282

Occupation periods of associated sites: EBA, Roman/Byzantine

Number of routes emanating from the site(s): 14

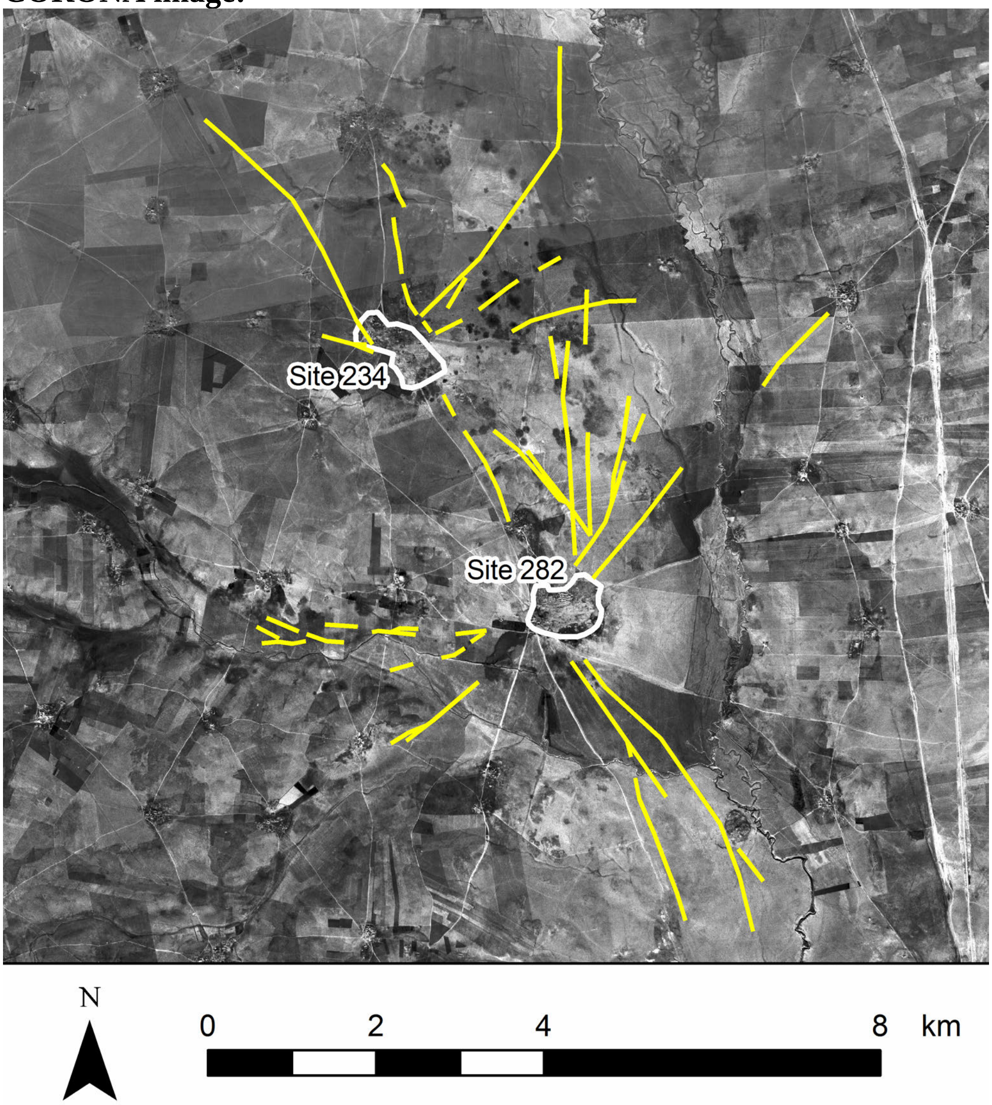
Total number of routes (after bifurcations): 14

Number connecting to other sites: 3

Furthest length of terminating routes: 4 km

Furthest length of site-connecting routes: 5.3 km

CORONA image:



Description: This is the largest conglomeration of hollow ways in the area. Seven ways emanate from Site 234 and eight from Site 282, one of these in each case connecting the two, 3 km apart. One of the sites connected to this network by a hollow way is the major EBA settlement of Tell Barabra east.

Hollow Way Network 2

Associated Sites: Site 3 (Tell Bandar Khan)

Occupation periods of associated sites: EBA, MBA, Iron Age, Roman/Byzantine, Islamic era

Number of routes emanating from the site(s): 6

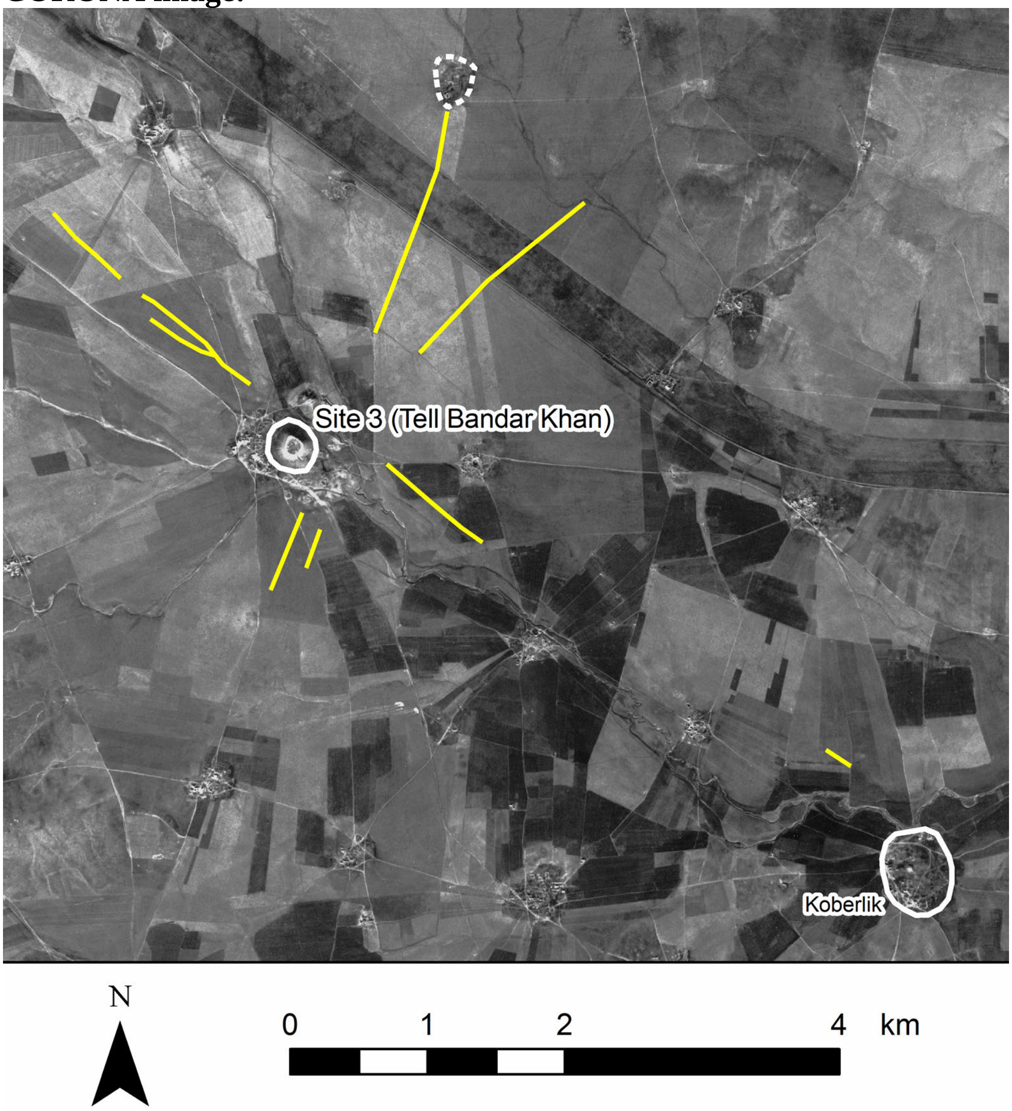
Total number of routes (after bifurcations): 7

Number connecting to other sites: 1, possibly 2

Furthest length of terminating routes: 2 km

Furthest length of site-connecting routes: 2.6 km, possibly 5.5 km

CORONA image:



Description: Tell Bandar Khan features the largest number of hollow ways of any EBA site in the area. One definite route connects with a small site on the other side of the Turkish border, while a second could have connected to the EBA settlement of Koberlik, as a section of a routeway on a similar trajectory emanates from the latter site.

Hollow Way Network 3

Associated Sites: Site 391

Occupation periods of associated sites: not available

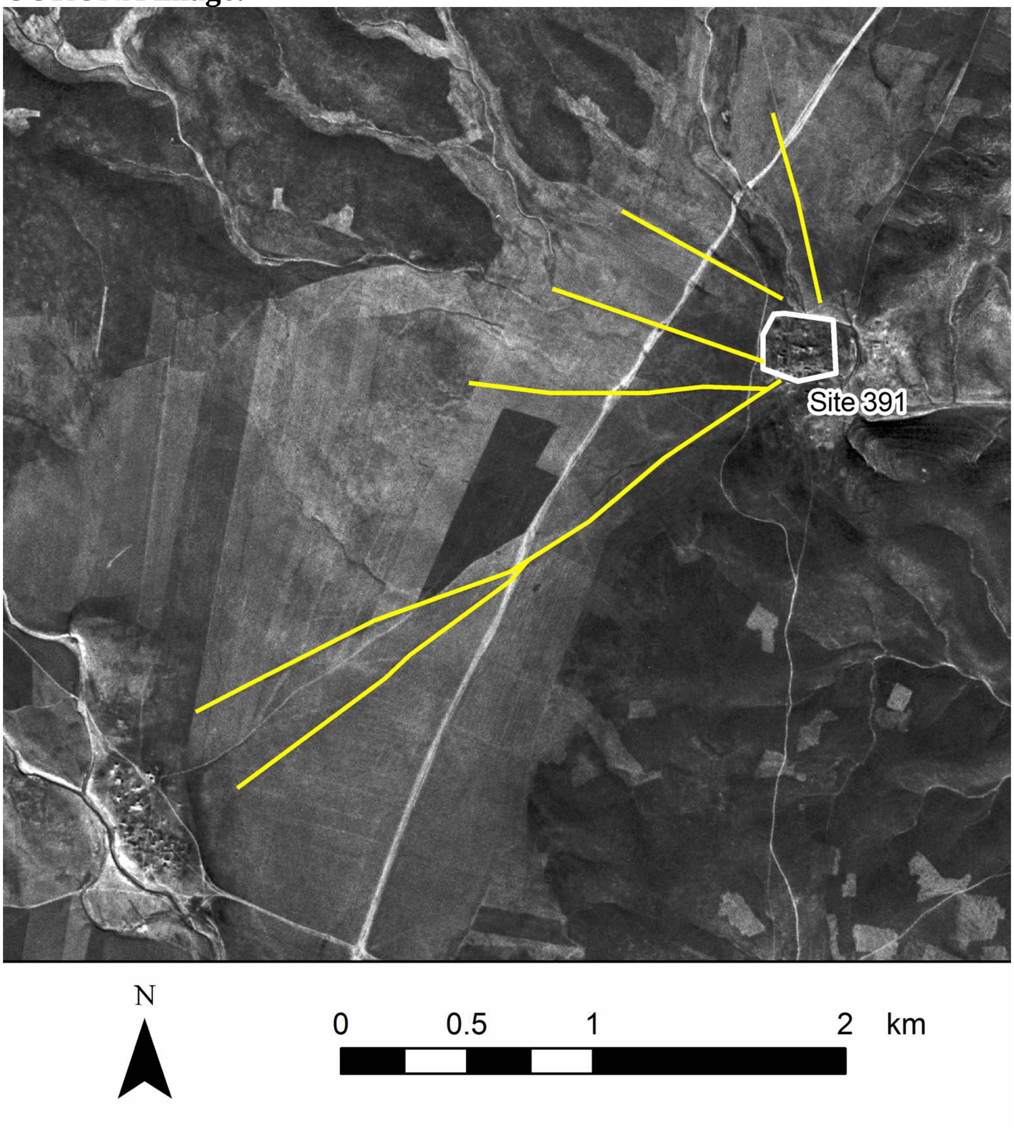
Number of routes emanating from the site(s): 4

Total number of routes (after bifurcations): 6

Number connecting to other sites: 0

Furthest length of terminating routes: 3 km

CORONA image:



Description: The hollow ways emanating eastwards out of Site 391, the only southern site containing these features, mostly peter out after between 800 and 1200 metres, likely restricted by the sides of the valley in which the settlement is located. The longest route, which follows the valley floor, terminates at a natural watercourse.

4.2.5.2. Qanats

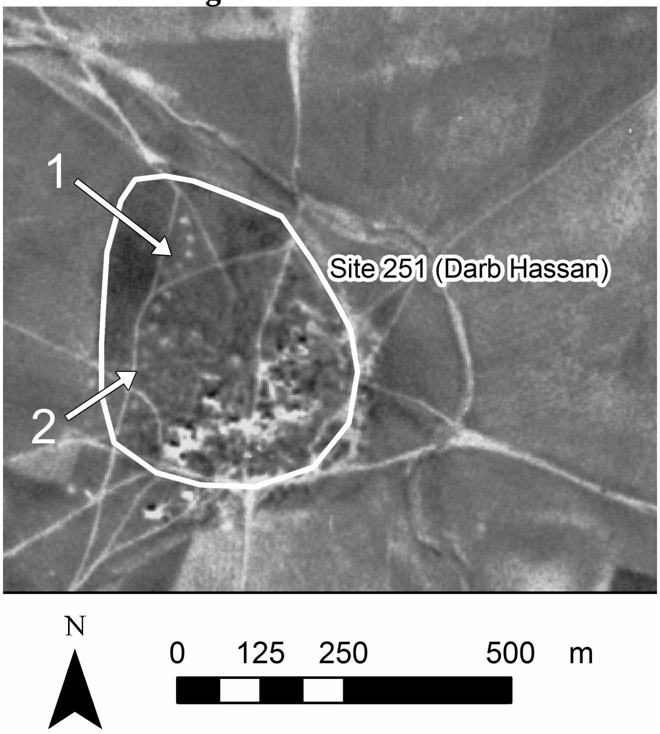
Qanat 1

Associated Sites: Site 251 (Darb Hassan)

Occupation periods of associated sites: EBA

Traceable length: 230 metres, possibly 312 metres

CORONA image:



Description: The only clear evidence for a qanat in the *Westjazira* Survey region, this feature appears on satellite imagery as a very characteristic series of small white dots in immediate proximity to a wadi. However, it exhibits several curious idiosyncrasies. Apart from the feature's unusual existence *within* the borders of a site, it is also atypical due to its curvilinear path. The shape made by its course of 230 metres resembles a vertically elongated mirror-image "S" [1]. A less prominent, but still possible path of the qanat leads 120 metres further south from the apex of the southern curve of the "S" [2]. No dating evidence exists for this feature; however its location superimposed on an EBA site suggests it probably post-dates this period. Little more can be said about this qanat, especially as, despite being visible on multiple CORONA missions, it is obscured on modern satellite imagery.

4.2.6. Combined Overview of Survey Area

The spatial distribution of sites in the *Westjazira* Survey / Sweyhat Reconnaissance area is uneven (see Fig. 4.21). A large variety of site types definitely and tentatively dated to the period under study, including two-tiered fortified tells, conical and truncated conical tells, and flat settlements, exist across the entire geographical landscape. However, the numbers of all site types are more concentrated in the northern half of the region, where ca. 80% (145 sites) represent 82% of the settled area. Additionally, a little over 50% (92 sites; 65% of settled area) are clustered in the area's northeast quadrant, including the only representation of a *true Kranzhügel* and most of the *Matin-variety* tells. The same is true of the vast majority of hollow ways, which, with one exception, are all in this area, situated in the vicinity of the Qaramukh river (see Fig. 4.22).

The west and northwest of this region, comprising the Sarugh uplands, not only contains fewer sites, but is also harder to survey, both on the ground and by satellite imagery. Nevertheless, the discovery of over 100 features in this area, over half identified solely by remote sensing, indicates that this difficulty did not hinder the investigation much. The discovery of Site 445, one of the most intriguing features identified by this entire analysis, in the Sarugh, further confirms this, as does the identification of one of the few examples of hollow ways in the southern area, emanating from the tell Site 391.

The arid southern regions, below the 250 mm isohyet, contains as expected, fewer sites. Nevertheless, some 40 features were identified here, indicating an archaeological landscape that is far from empty, including around 20 settlements identified on the ground by Danti (2000). In this area, the *ringwall settlement* Site 408 is significant both as the sole example of that site type in the Euphrates-Balikh steppe and its unusually small size. Other sites in this arid region are either EBA tells or flat settlements of a presumably Roman date and later, with a concentration in the southeast in the vicinity of a relict channel of the Balikh leading to the Euphrates. Canals and qanats are notable by their conspicuous absence from the landscape.

Section 4.3: Yale Khabur Survey Region

4.3.1. The Archaeological Landscape

The landscape of the Yale Khabur Survey is dominated by the Jebel Abd al-Aziz, running latitudinally across the centre of the roughly 6000-square-kilometre surveyed area. This mountain range also splits the settlement distribution as recorded by the survey, with just under two-thirds of sites located north of it and the majority of the remainder south, with only two sites identified on the uplands themselves. The northern batch of sites is largely divided into two rough alignments, one following the northern slopes of the Jebel, and the other the Upper Khabur at a distance of 6-8 km. To the south, there is less of a

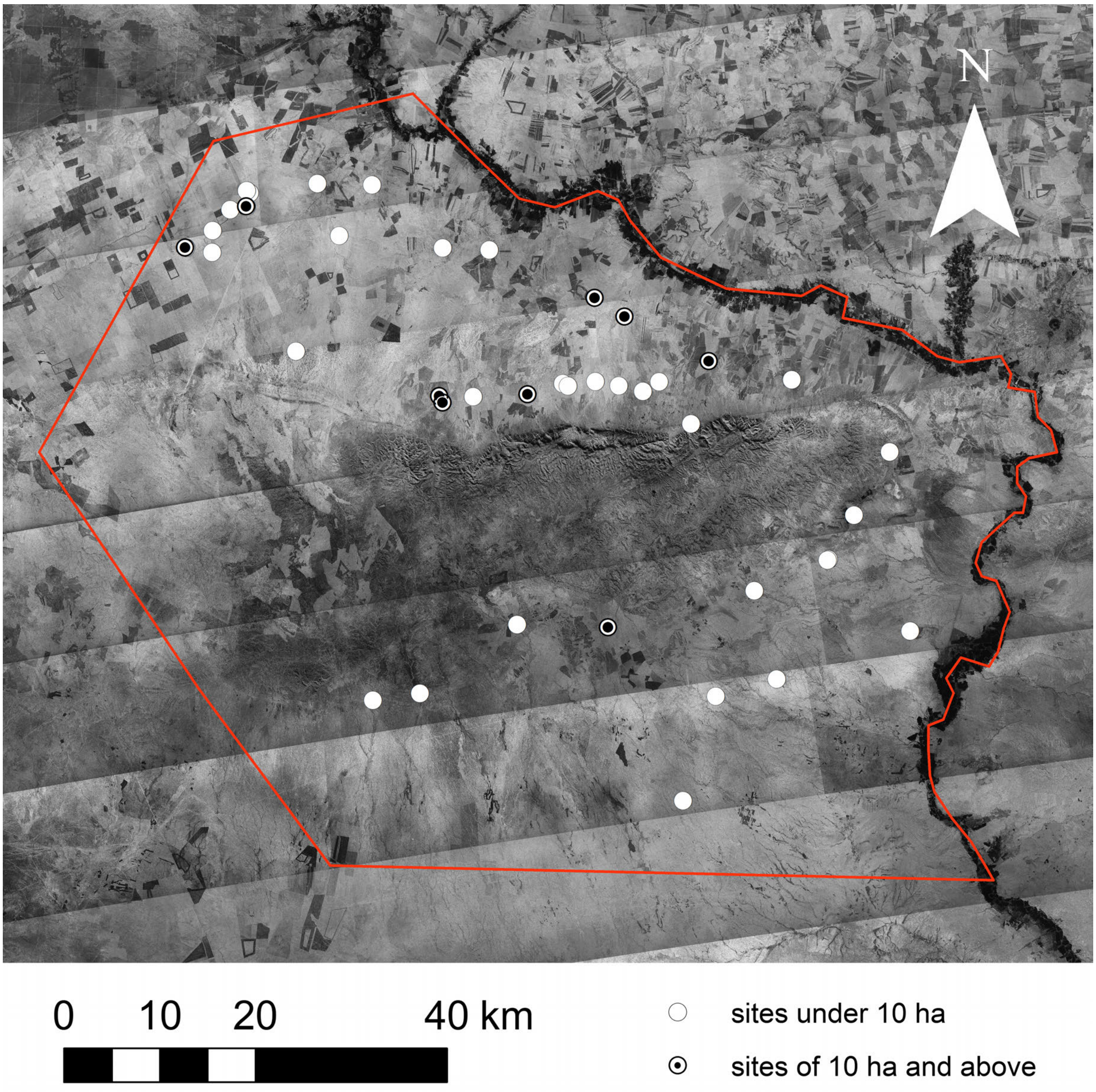


Figure 4.5: CORONA image (Mission 1105-1) of the Yale Khabur Survey area showing all sites identified by the ground survey.

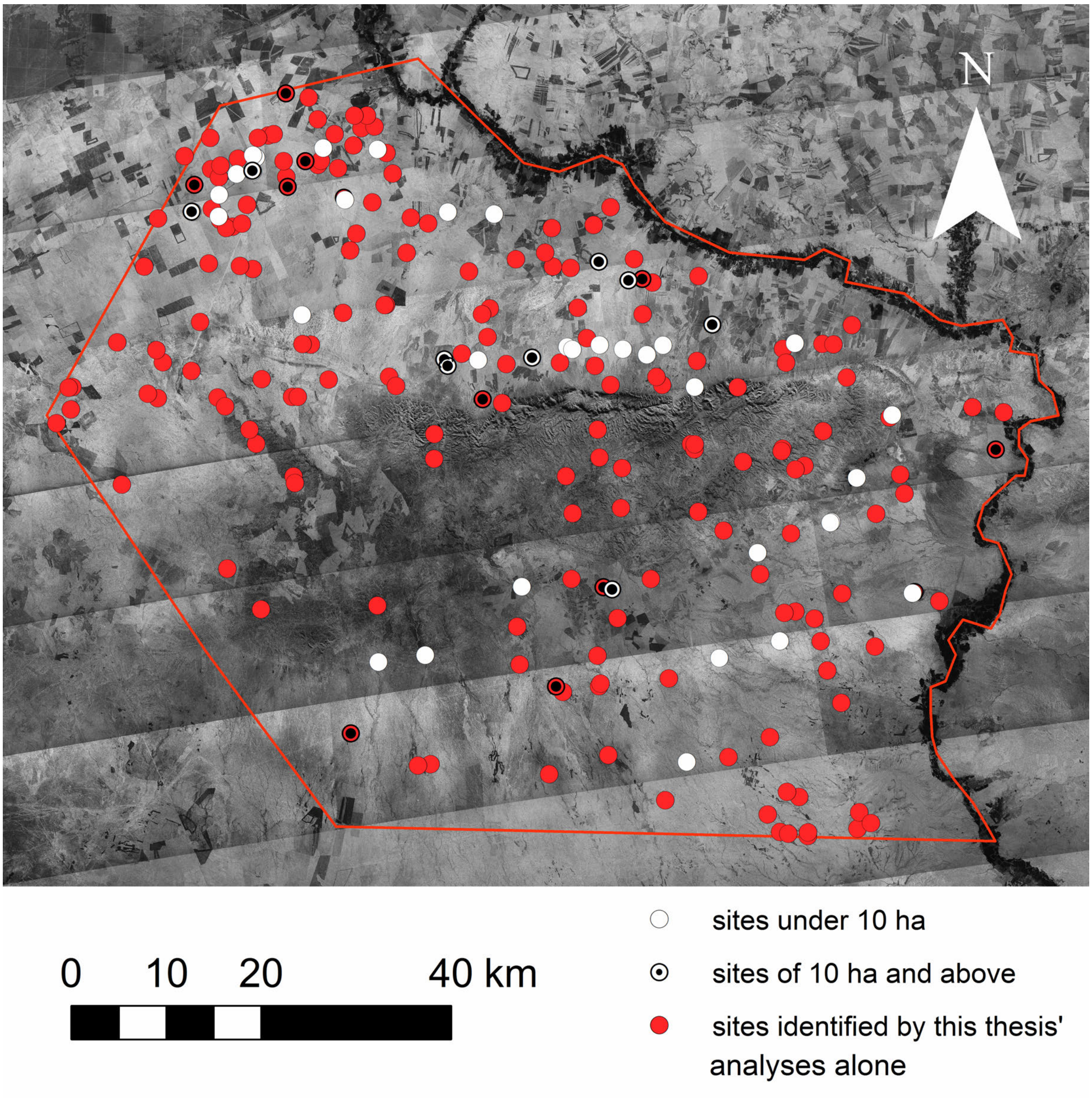


Figure 4.6: CORONA image of the Yale Khabur Survey area showing all sites identified by both the ground survey and the remote sensing survey.

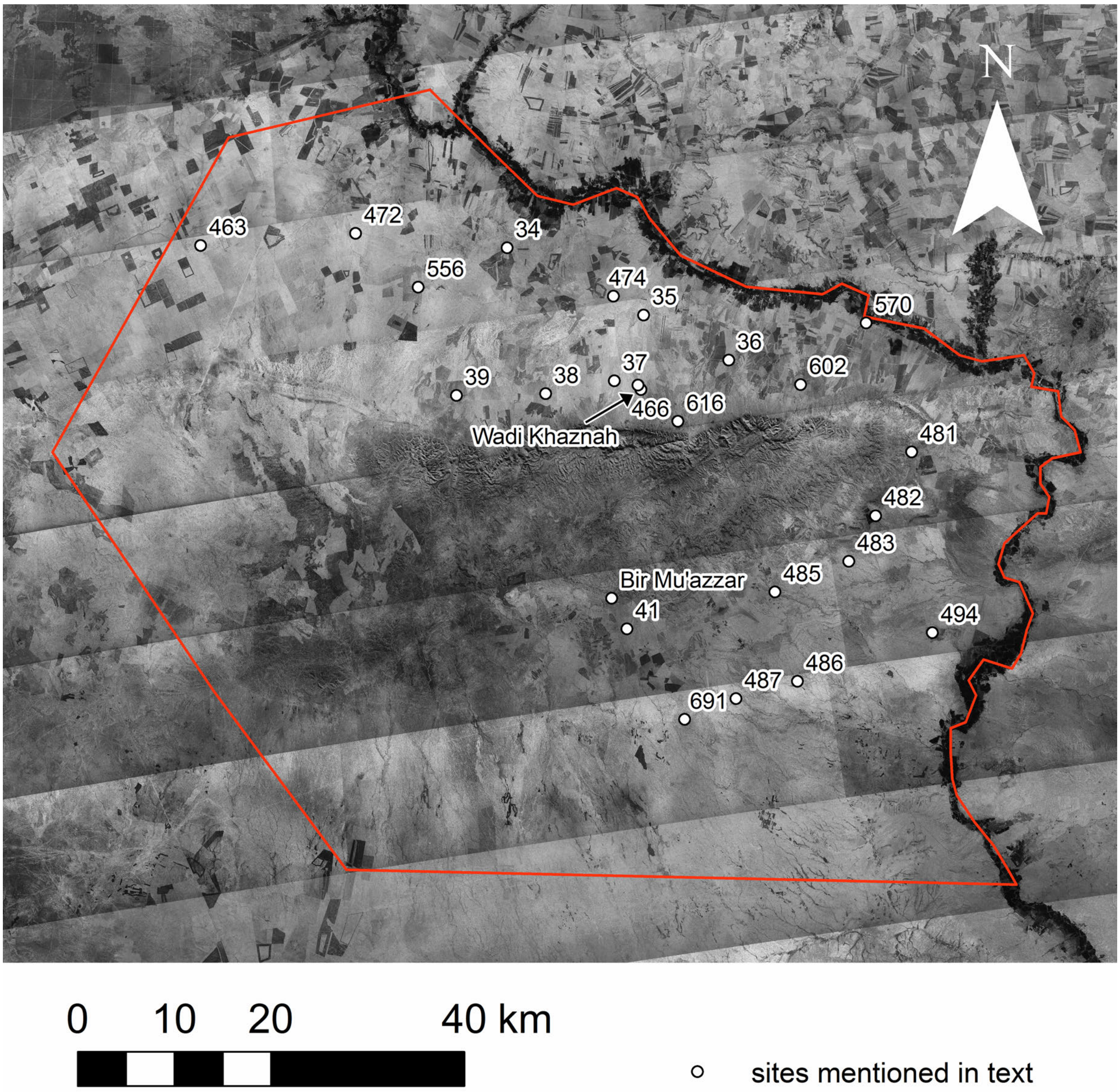


Figure 4.7: CORONA image of the Yale Khabur Survey showing all sites mentioned in text, by this thesis' numbering system.

pattern, with sites along the southern foothills of the Jebel and the Lower Khabur mingling with other settlements fairly evenly distributed across the arid steppe (Fig. 4.5). Of the nine larger sites (above 10 ha) identified by the survey, all but one, the *ringwall settlement* Tell Mu'azzar, are located north of the Jebel Abd al-Aziz.

Adding in sites identified by remote sensing changes this apparent pattern quite drastically, with the distribution of sites becoming much more even. Only around half of all features (82 out of 151 sites) now appear north of the Jebel Abd al-Aziz, while 40% (58 sites) are located to its south. The remainder comprises 11 sites on the uplands. The pattern of larger sites (10+ ha) remains similar however, with just over 80% (13 sites) located north of the Jebel (Fig. 4.6).

4.3.2. Tell Sites

4.3.2.1. Two-Tiered Fortified Tells

The Yale Khabur Survey area contains eight two-tiered fortified tell sites, all of which were visited on the ground. Six of these are located north of the Jebel Abd al-Aziz: three along the northern foothills of the mountain, two within the vicinity of the Khabur, and one, Tell Mabtuh Sharqi, close to both the Jebel and the Khabur. South of the mountain range are Tell Mu'azzar, close to its southern foothills, and Tell Mityaha out in the semi-arid steppe. These sites range from 2.5 to 44 hectares in size, and comprise *true Kranzhügel*, *ringwall settlements*, and two sites that are too unclear to categorise.

Site 36 (Tell Mabtuh Sharqi)

Size: 44 ha

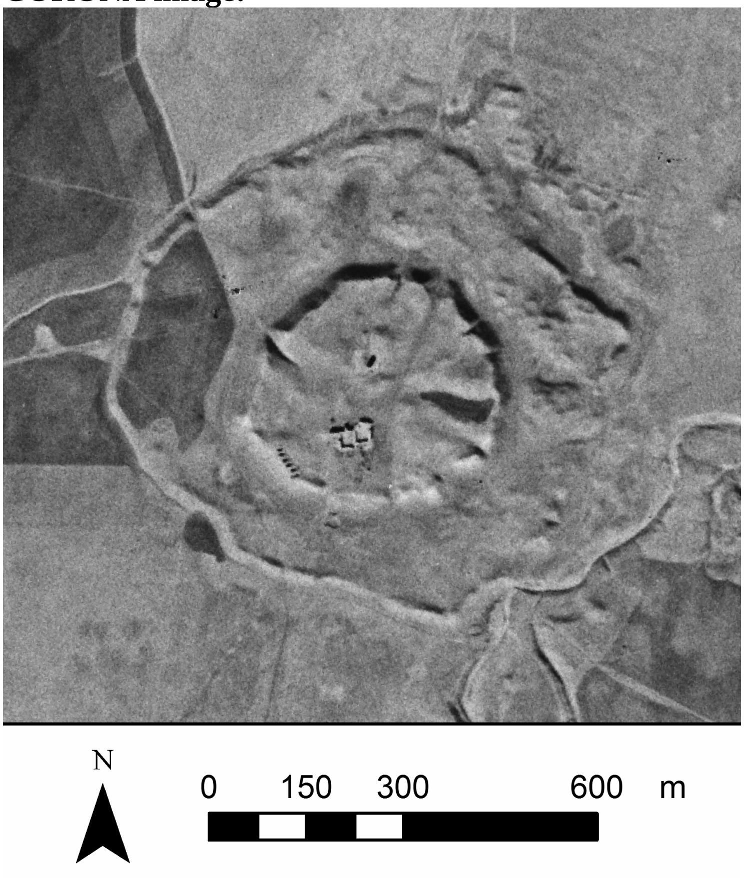
Morphology: sub-circular/polygonal *true Kranzhügel* with a central depression

Visited in the field (reference): yes (Gernez & Souleiman 2013; Hole 1996; Kouchoukos 1998; Kühne & Schneider 1988; von Oppenheim in Moortgat-Correns 1972)

Occupation periods: Halaf, EBA, Iron Age, Roman/Byzantine

EBA occupation phases: EJZ 2-5

CORONA image:



Description: Tell Mabtuh Sharqi is situated 4 km north of the lower slopes of the Jebel Abd al-Aziz and roughly 7 km southwest of the Khabur, adjacent to a minor tributary. This is one of the largest sites in the entire GWJ. Its circular central mound has a "flat" appearance, though also shows signs of having a central depression, something also claimed by von Oppenheim (Moortgat-Correns 1972: 32) and Meyer and Orthmann (2013: 149). It also shows evidence of run-off gulleys on satellite imagery, possibly having hollowed out previous streets and inner city gates, particularly to the northwest and southeast. Tell Mabtuh Sharqi's concentric lower town is an irregular circle on its western side, but an angular polygon on its eastern, particularly southeastern, side. Its outer wall features several gaps that could be city gates. High-resolution GeoEye imagery from GoogleEarth shows structures of around 10 by 10 metres with subdivided rooms, all aligned southwest to northeast, located within the excavation trenches (Fig. 4.8). CORONA imagery shows the existence of numerous hollow ways emanating from Tell Mabtuh Sharqi, extending in all directions, some to a significant distance. The earliest remains at Tell Mabtuh Sharqi were found on the central mound (Gernez 2012).

Figure 4.8: GeoEye imagery of structures visible within the excavation trenches at Tell Mabtuh Sharqi.

Site 39 (Tell Mabtuh Gharbi)

Size: 28 ha

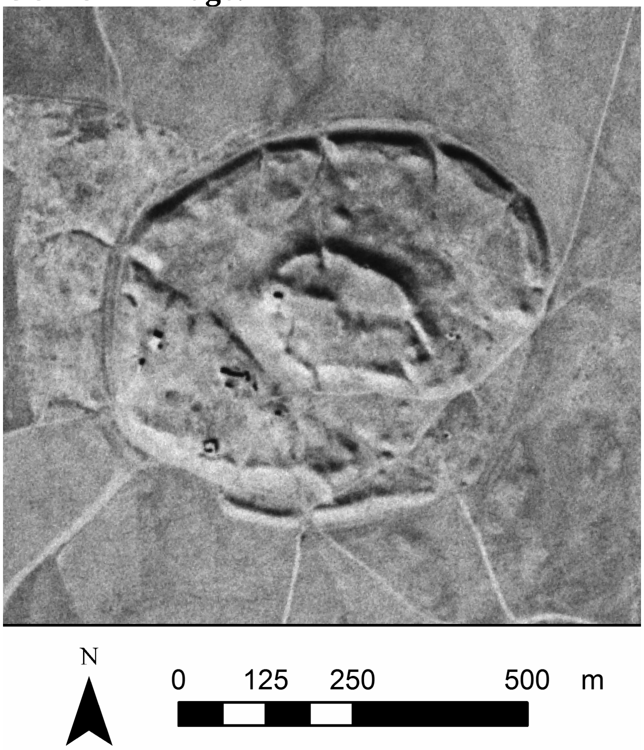
Morphology: sub-circular *true Kranzhügel* with a central depression

Visited in the field (reference): yes (Hole 1996; Hole 2002-03; Kouchoukos 1998; Kühne & Schneider 1988; von Oppenheim in Moortgat-Correns 1972)

Occupation periods: Palaeolithic, EBA, Iron Age

EBA occupation phases: EJZ 1-3b

CORONA image:



Description: Tell Mabtuh Gharbi is situated 4 km north of the foothills of the Jebel Abd al-Aziz, and 20 km west of the Khabur. Only small seasonal watercourses are present in its vicinity. The depression visible in the site's central mound was confirmed by Meyer and Orthmann (2013: 149), and shows evidence of deep run-off gulleys that may be hollowed-out gates. Unusually for a *true Kranzhügel*¸ this upper town appears as an irregular sub-circular feature. The site's lower town is equally irregular, appearing as an ellipse to the northeast and an angular polygon to the southwest, while its southeastern side appears to have been ploughed flat already by the mid-1960s, based on the CORONA imagery from that period. The site's outer wall shows evidence for numerous city gates. Beyond this, a ditch running around the entire site is visible on CORONA, a feature also noted by von Oppenheim (Moortgat-Correns 1972: 29). Extensive hollow ways emanate from Tell Mabtuh Gharbi, though are visible only leading in northerly directions.

Site 35 (Tell Hamam Sharqi)

Size: 16 ha

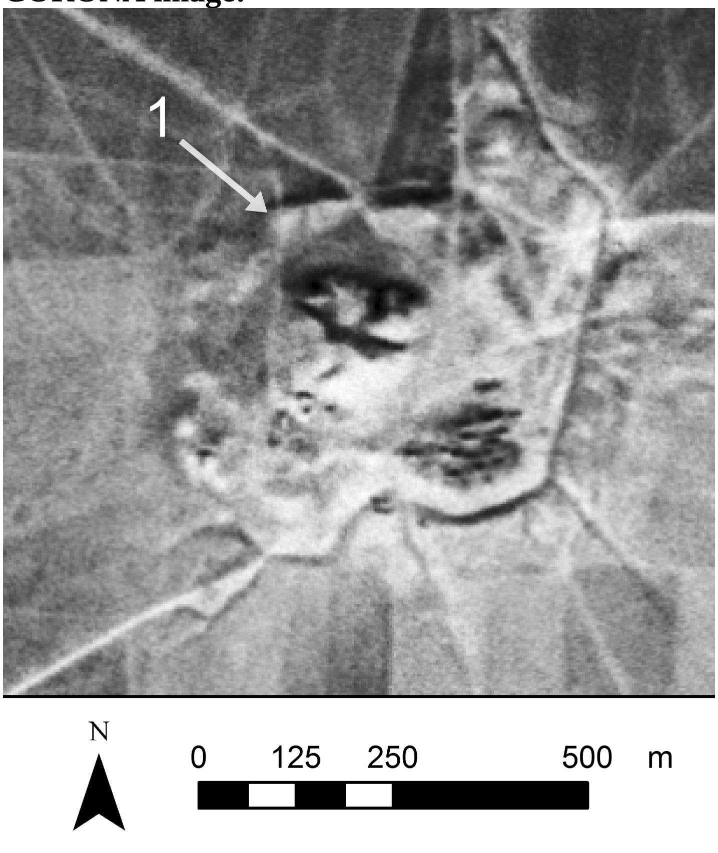
Morphology: pentagonal *ringwall settlement* with no central depression

Visited in the field (reference): yes (Kouchoukos 1998)

Occupation periods: EBA

EBA occupation phases: EJZ 3a-3b

CORONA image:



Description: This site is located 7 km southwest of the Khabur and 10 km north of the Jebel Abd al-Aziz, and situated between two seasonal wadis. Its central mound is roughly circular, with numerous weathered-out gulleys visible. The outer wall [1] appears to have been pentagonal, however its southeastern outline is hard to trace due to erosion caused by an encroaching watercourse. Hollow ways lead away from this site in all directions but west.

Site 34

Size: 4.5 ha

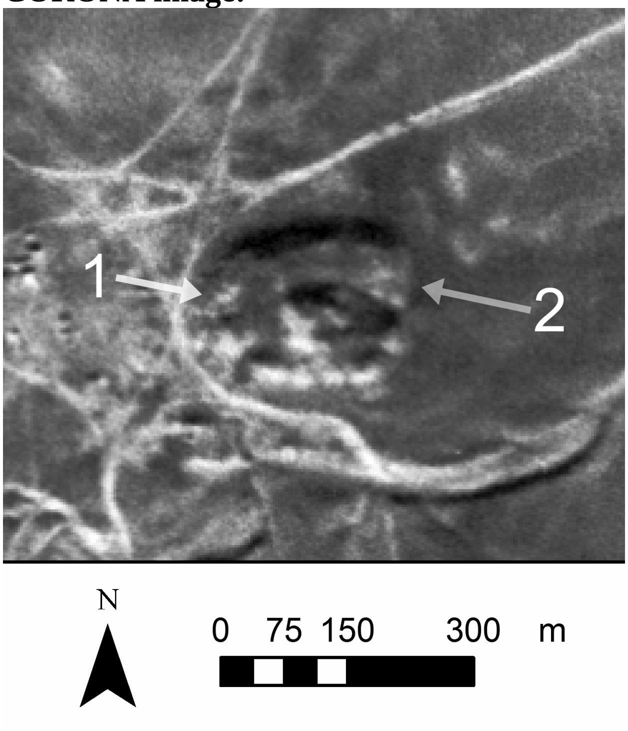
Morphology: sub-circular/polygonal *ringwall settlement* with no central depression

Visited in the field (reference): yes (Kouchoukos 1998)

Occupation periods: EBA

EBA occupation phases: EJZ 3a-3b

CORONA image:



Description: Around 16 km northwest of Tell Hamam Sharqi, and 6 km from the Khabur on the Wadi Karghazz, lies Site 34. Its central mound appears circular on CORONA imagery, and is situated somewhat off-centre to the southeast. The outer wall is irregularly shaped, appearing circular to the west [1], but polygonal to the east [2]. Beyond this, hollow ways emanate to the north and southeast.

Site 38 (Tell al-Magher)

Size: 13 ha

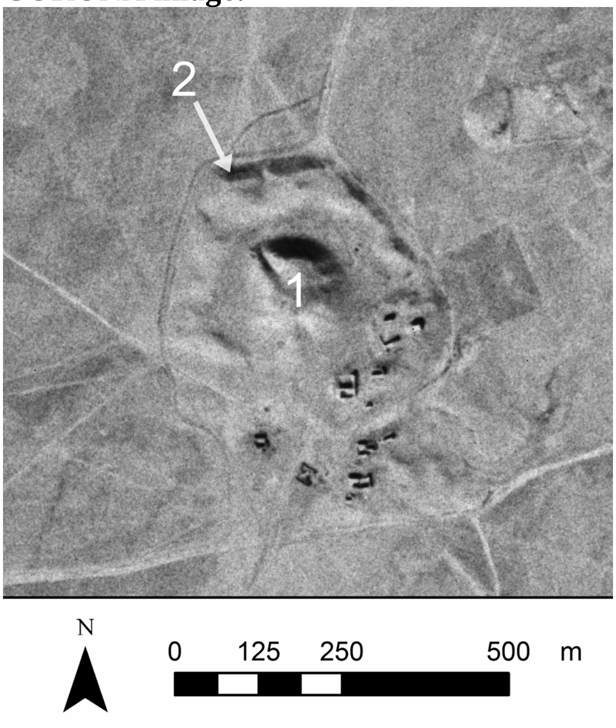
Morphology: pentagonal *ringwall settlement* with no central depression

Visited in the field (reference): yes (Kouchoukos 1998; Kühne & Schneider 1988; von Oppenheim in Moortgat-Correns 1972)

Occupation periods: EBA

EBA occupation phases: EJZ 1-3b

CORONA image:



Description: This site lies thirteen kilometres southwest of Tell Hamam Sharqi and 3 km north of the foothills of the Jebel Abd al-Aziz, and is located at the top of a branch of the Wadi el-Ja'us. Von Oppenheim describes both its central mound and outer wall as having originally been square (Moortgat-Correns 1972: 30-31); however this is not how they appear on CORONA imagery. Instead, the central mound [1] is clearly circular, with some weathered-out gulleys, particularly to the northwest, where a very prominent "cut" in the side of the mound is visible. Tell al-Magher's outer wall [2] is a definite pentagon, in which gaps indicating possible city gates are vaguely visible. Von Oppenheim's assertion that a "*großes Gebäude aus Steinen*"[75] stretched between the central mound and the outer wall on the site's northeastern side (*ibidem*) is a reminder that the "featurelessness" of this area of *ringwall settlements* is a product of their appearance on satellite imagery, and not necessarily concurrent with ground truth. Tell al-Magher features very prominent hollow ways extending outwards in all directions.

[75] "[large structure of stones]"

Site 41 (Tell Mu'azzar)

Size: 14 ha

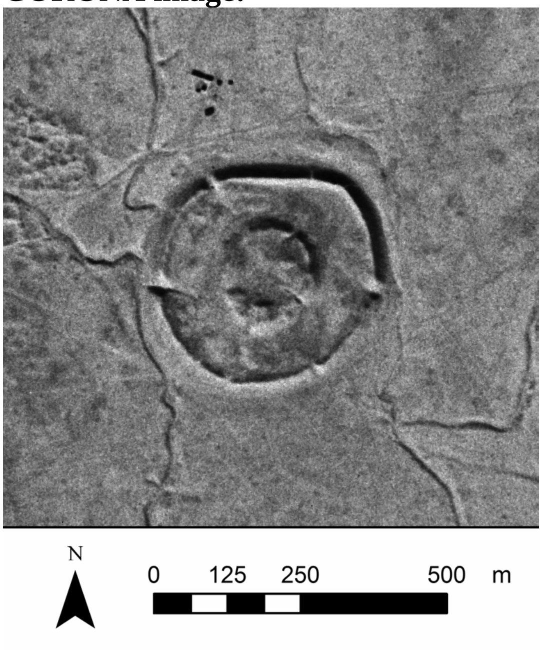
Morphology: pentagonal *ringwall settlement* with a central depression

Visited in the field (reference): yes (Kouchoukos 1998; Kühne & Schneider 1988; Preuss 1989; von Oppenheim in Moortgat-Correns 1972)

Occupation periods: EBA

EBA occupation phases: EJZ 1-3b, possibly until EJZ 5

CORONA image:



Description: The most significant *ringwall settlement* on the southern side of the Jebel Abd al-Aziz, and indeed one of the clearest examples of this settlement type in the entire GWJ, Tell Mu'azzar is located 3 km south of the mountain's foothills, and is situated between two of the larger wadis in its environs. This site's central mound is very clearly circular and flat on top, though CORONA imagery shows a slight indication of the central depression noticed by von Oppenheim (Moortgat-Correns 1972: 33-34) and stated by Meyer and Orthmann (2013: 149). An inner wall is vaguely noticeable, in which three clear and two further less clear gaps are discernible. The lower town is less empty than other satellite imagery views of *ringwall settlements*, with a slightly undulating surface noticeable to the western side in particular. This chimes with von Oppenheim's observations (Moortgat-Correns 1972: 33). The outer wall features three clear and two less clear gaps (possibly city gates), two of which align with those on the central mound to form a rough northwest to southeast axis (see also *ibidem*: Abb. 8). Particularly clearly visible hollow ways emanate from Tell Mu'azzar in most directions, though more noticeably so to the south.

Site 487 (Tell Mityaha)

Size: 2.6 ha

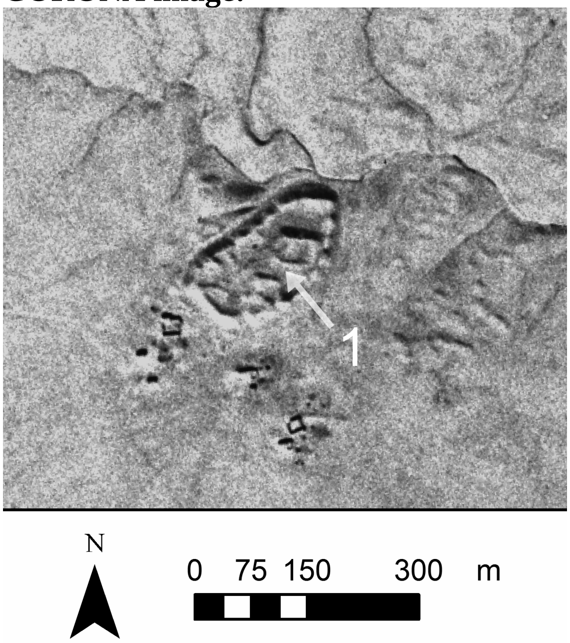
Morphology: elongated pentagonal *ringwall settlement* with a possible central depression

Visited in the field (reference): yes (Kouchoukos 1998; Preuss 1989; von Oppenheim in Moortgat-Correns 1972)

Occupation periods: EBA, Iron Age, Roman/Byzantine

EBA occupation phases: EJZ 1-3b

CORONA image:



Description: Thirteen kilometres southeast of Tell Mu'azzar, Tell Mityaha is a particularly small ringwall settlement situated on an eponymous wadi. Located 10 km southeast of the Jebel Abd al-Aziz foothills and 22 km west of the Khabur, it is more isolated from either than any of the abovementioned sites. The appearance of Tell Mityaha on both satellite imagery and an aerial photo by Poidebard (1928: Pl. LXIII, 1) is unusual, with its central mound extremely angular and strongly off-centre to the southeast [1]. This feature appears almost trapezoidal, however with a very pronounced east-west ridge, something also noted by von Oppenheim (Moortgat-Correns 1972: 37). Its surface is so undulating that it is hard to say whether it ever contained a central depression, though Meyer an Orthmann (2013: 149) assert that it does. To the east and southeast the upper town is directly adjacent to the outer wall, which is extremely irregular in shape. It appears as an elongated pentagon with rounded corners, stretching from southwest to northeast. Many gaps are visible in this; more than can reasonably be assumed to have been city gates, indicating a significant amount of erosion. Faint hollow ways lead away from Tell Mityaha, primarily to the south.

Site 37

Size: 7.3 ha

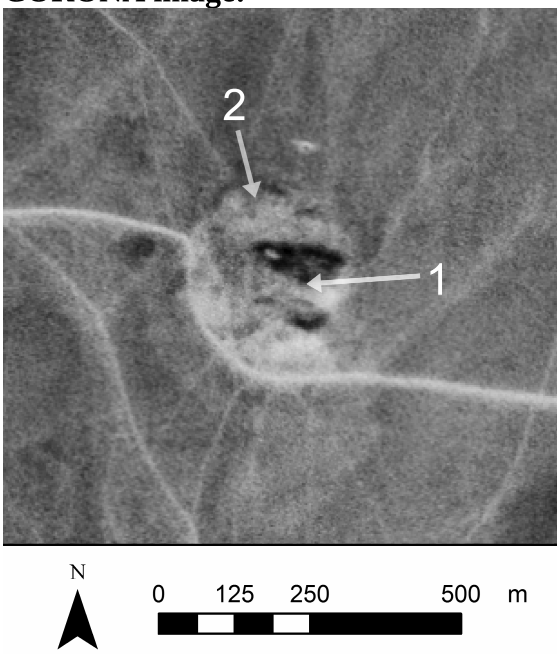
Morphology: potential elliptical *ringwall settlement* with a linear central depression

Visited in the field (reference): yes (Kouchoukos 1998)

Occupation periods: EBA

EBA occupation phases: EJZ 1-3b

CORONA image:



Description: This two-tiered fortified tell is too unclear on satellite imagery to confidently categorise, however it leans towards being a *ringwall settlement*. Site 37 is located 3 km north of the Jebel Abd al-Aziz foothills, in between Tells Mabtuh Sharqi and al-Magher, and 2.5 km west of Tell Khaznah. Though identified as a “Kranzhügel” (site number K156 in Kouchoukos 1998: 368) by the Yale Khabur Survey, this generic term was seemingly used to describe any fortified tell settlement, as it was applied to many sites that bear no traces of being two-tiered fortified tells on remote sensing data. On CORONA imagery, it is possible to discern a central mound [1] that is seemingly almost square, with a deep depression running east-west through its middle. This mound is located off-centre to the southeast of the site, and has no discernible surrounding wall. Beyond this, a distance of around 60 metres to the north, northwest, and west separates the central mound from a clear outer wall [2], to which it is adjacent to the southeast. This probable lower town is too narrow and the CORONA image quality too low to ascertain whether it appears empty or contains discernible human activity. The outer wall has the form of an ellipse, slightly stretched in a southeasterly to northwesterly direction. Hollow ways appear to emanate from Site 37 to the south, at least, though none are very clear on satellite imagery.

4.3.2.2. Other Tells

Other tell sites are very evenly spread out across the survey area, with an equal number located both north and south of the Jebel Abd al-Aziz, as well as a few on the uplands themselves. Not counting those along the Khabur valley, 80 definite or probable tells without a two-tiered fortified morphology were identified by this analysis. These comprise a large size range from under 1 to 10 ha.

Site 474 (Tell Hamam Gharbi)

Size: 10 ha, possibly 40 ha

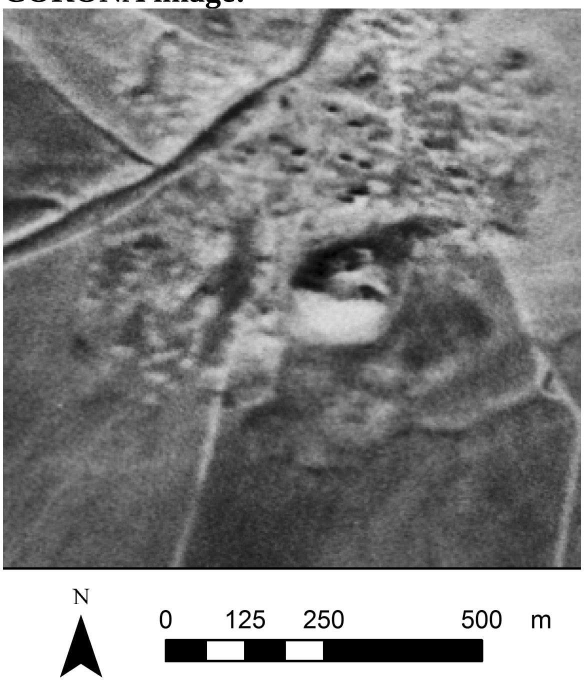
Morphology: truncated conical tell with a lower town

Visited in the field (reference): yes (Kouchoukos 1998)

Occupation periods: EBA

EBA occupation phases: EJZ 1-3b

CORONA image:



Description: This site is located 7 km from the Khabur, adjacent to a branch of the Wadi el-Ja'us, and 3.5 km northwest of Tell Hamam Sharqi. Its mound features hollowed-out gulleys on the northern and eastern side. Around this, a strongly undulating surface makes up the remainder of the settlement's area. Thus this tell is certainly a two-tiered settlement, though without any characteristic fortified ramparts. Kouchoukos (1998: 368) marks Tell Hamam Gharbi as a tentative "Kranzhügel". Furthermore, beyond the lower town a less clear but still visible faintly undulating surface pushes the maximum possible settlement size to 40 ha, though some of this is obscured by modern settlement. Hollow ways lead away from the site to the south.

Site 466 (Tell Khaznah)

Size: 10 ha

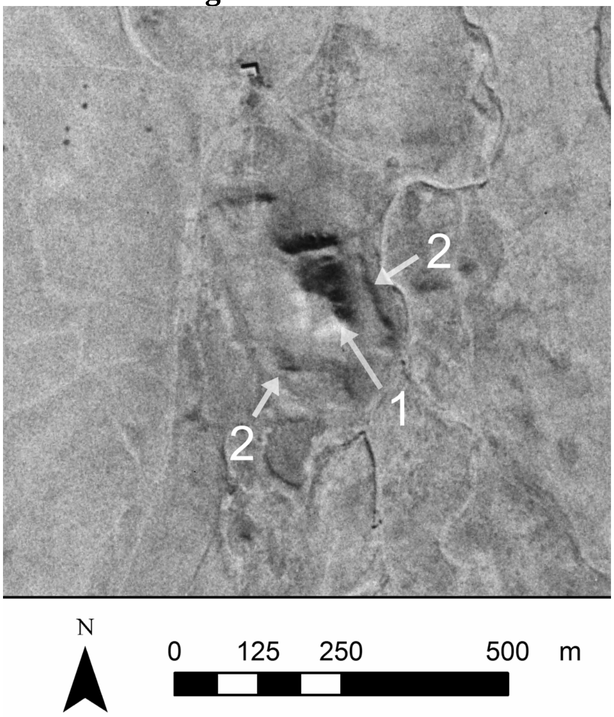
Morphology: rounded rectangular high tell with a lower town

Visited in the field (reference): yes (Kouchoukos 1998)

Occupation periods: Halaf, EBA

EBA occupation phases: EJZ 1-3b

CORONA image:



Description: Situated adjacent to a seasonal wadi, Tell Khaznah is located around 3 km north of the Jebel Abd al-Aziz. The almost rectangular central mound of this site [1] is incised with significant weathering gulleys in an east-west direction. Around this, the lower town appears as a strongly undulating surface, in parts indicating possible structures which could potentially include ramparts [2]. The entire area is so uneven, however, that it is not possible to confidently discern shapes to confirm this. The ground visit by the Yale Khabur Survey equally makes no mention of fortifications (Kouchoukos 1998: 368).

Site 481 (Tell Barud)

Size: 3 ha

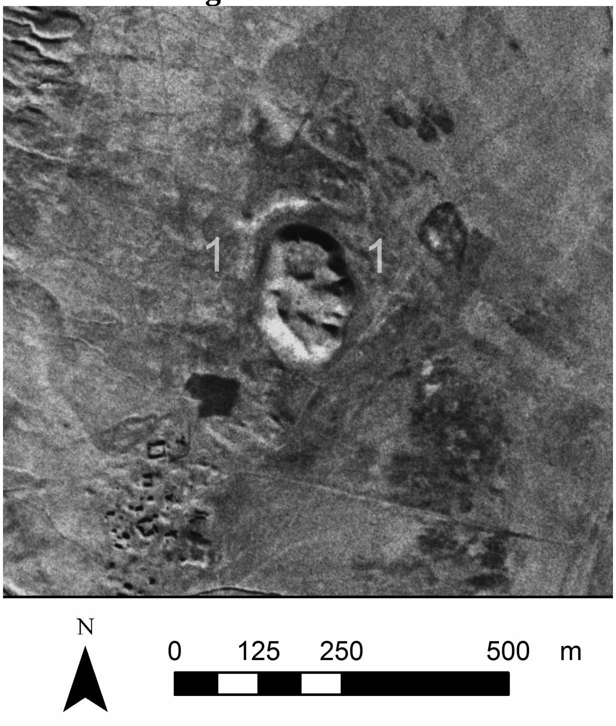
Morphology: irregular elliptical truncated conical tell

Visited in the field (reference): yes (Kouchoukos 1998; Preuss 1989)

Occupation periods: EBA, Iron Age, Roman/Byzantine

EBA occupation phases: EJZ 3a-3b

CORONA image:



Description: Tell Barud lies directly adjacent to the eastern edge of the Jebel Abd al-Aziz, 13 km west of the Khabur. This high mound has a strongly undulating inside surface visible on CORONA. The surface around the tell [1] is also vaguely undulating. Kouchoukos (1998: 368) describes this site as a "high mound with outlying wall remnants", however these are completely absent from any remote sensing data. A conglomeration of square structures is visible directly to the tell's south.

Site 486 (Tell Murtiya/Marthiya)

Size: 2.6 ha

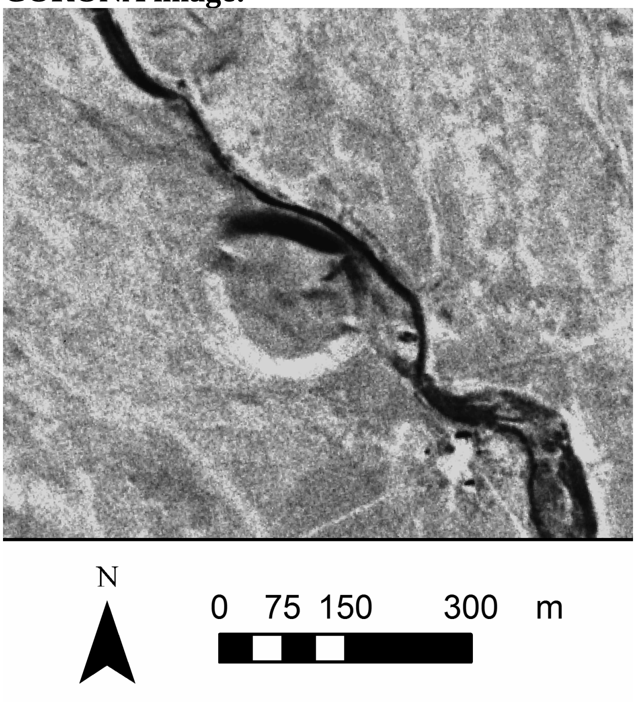
Morphology: elliptical truncated conical tell

Visited in the field (reference): yes (Kouchoukos 1998; Preuss 1989)

Occupation periods: EBA

EBA occupation phases: EJZ 1-3b

CORONA image:



Description: Located on a seasonal watercourse 13 km south of the Jebel Abd al-Aziz, Tell Murtiya (or Marthiya) is roughly equidistant between Tell Mu’azzar and the Khabur (18 km from each); fairly isolated in an arid region of 250 mm annual precipitation. Its high mound appears to consist of a single large depression at its centre. Three clear and one less clear gulleys cut through the outer edge of the mound in all directions but the southwest.

Site 463 (Tell Tukal)

Size: 2.5 ha

Morphology: elliptical truncated conical tell

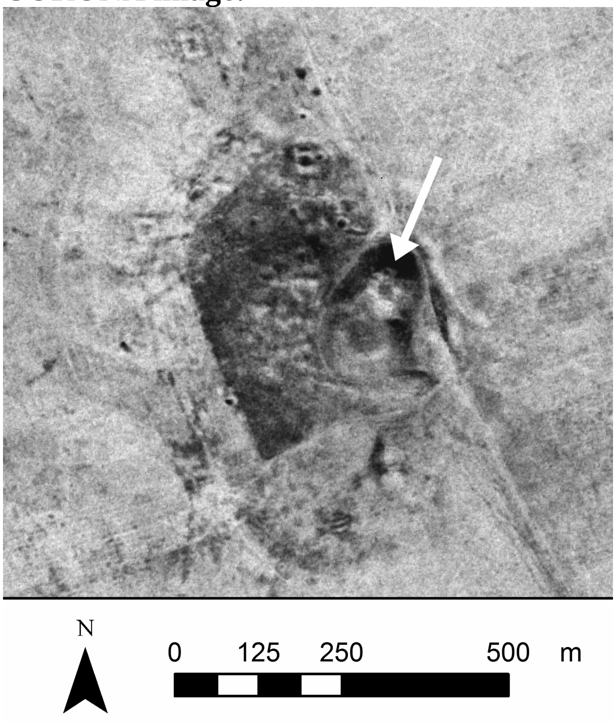
Visited in the field (reference): yes (Kouchoukos 1998)

Occupation periods: Palaeolithic, Ubaid, LC, EBA, Iron Age, Roman/Byzantine

LC occupation phases: LC 1-3

EBA occupation phases: EJZ 3a-3b

CORONA image:



Description: Tell Tukal lies on the far northwestern edge of the survey area, nearly 30 km from the Jebel Abd al-Aziz. The LC occupation of the tell makes it one of the very few settlements dating, at least in part, to the 4th millennium BC. Its location is an area of relatively high rainfall for the Western Jazira, which despite still being semi-arid receives over 300 mm annual precipitation, while its situation on the easternmost part of the Wadi Hamar would have provided an additional seasonal source of water.

Site 494 (Tell Maraza)

Size: 0.7 ha

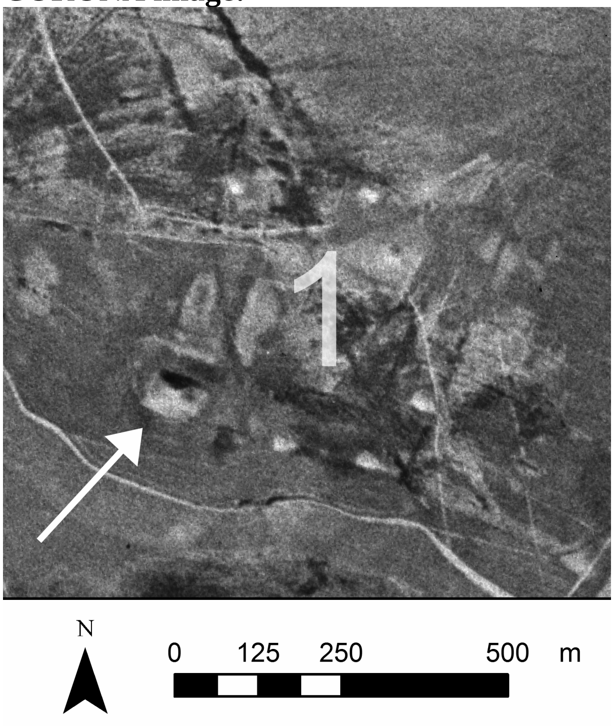
Morphology: elliptical conical tell

Visited in the field (reference): yes (Kouchoukos 1998; Kühne 1978-79)

Occupation periods: EBA, possible later occupation

EBA occupation phases: not available

CORONA image:



Description: Tell Maraza lies 15 km south of the Jebel Abd al-Aziz and 4 km west of the Khabur valley. The description of this site by the TAVO survey chimes with its appearance on remote sensing, but additionally mentions an extensive “lower town” adjacent to the mound’s northeastern side (Kühne 1978-79: 185). A closer look at CORONA imagery, however, reveals this to be not a contemporaneous outer town of the tell, but a 430 by 430-metre square enclosure with an interior undulating surface [1] of most probably later date. While the Yale Khabur Survey dates Tell Maraza to the Iron Age, Kühne (1978-79: 185) states that the ceramics found indicate a continuous occupation from the EBA to the Islamic era. Given the actual mound’s small size, however, this long-term human occupation is unlikely to have all occurred on it. It therefore appears most probable that the tell itself dates to the EBA (and possibly the Iron Age also), while the adjacent square site was occupied during the later periods, during which time the main mound may have been used as a citadel as at Kharab Sayyar (see Section 2.1.3.2).

Site 482 (Tell Makhrum)

Size: 2.8 ha (measured on CORONA), possibly 8 ha (Kouchoukos 1998)

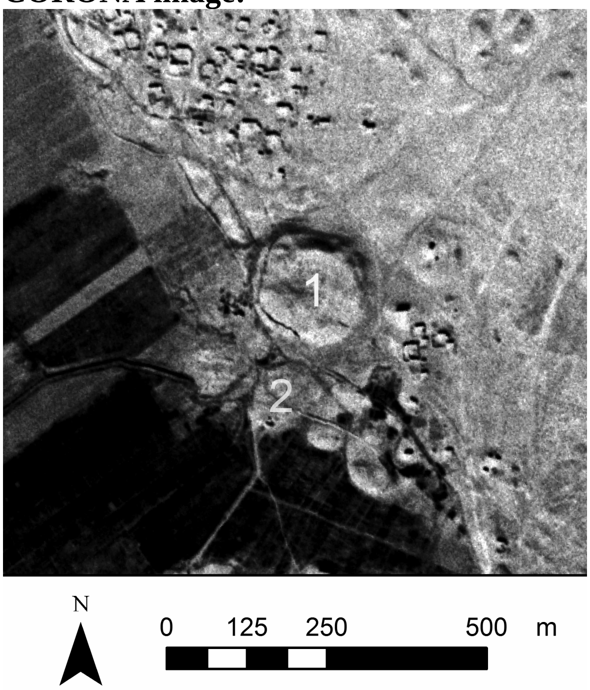
Morphology: circular truncated conical tell with possible ramparts

Visited in the field (reference): yes (Kouchoukos 1998; von Oppenheim in Moortgat-Correns 1972)

Occupation periods: EBA, Iron Age

EBA occupation phases: EJZ 3a-3b

CORONA image:



Description: Tell Makhrum is a fairly major site of unclear morphology located directly on the edge of a fertile terrace in the southern foothills of the Jebel Abd al-Aziz, 16 km west of the Khabur. This settlement appears as a clear tell similar to Tell Murtiya on remote sensing [1]. However, van Liere and Lauffray (1955: 140) includes it amongst their "*villes fortes*" (a term they used for two-tiered fortified tells), while Kouchoukos (1998: 368) lists it as a "Kranzhügel". The size of Tell Makhrum listed by Kouchoukos, 8 ha, indicates that the fortifications implied lie beyond the boundaries of the tell as apparent on satellite imagery. Indeed, on both CORONA and modern imagery from GoogleEarth, some small mound-like features encircling the central tell are faintly visible [2]. These could tentatively be sections of a severely damaged outer wall. However, the features are only clearly visible on the southern side of the tell, and bear a strong similarity to the natural topographical variations in the mountainous terrain directly to the site's east. Additionally, a modern settlement sits directly on these potential parts of the site, even on imagery from the 1960s. Thus it cannot be at present conclusively categorised as a two-tiered fortified tell.

4.3.2.3. Combined Overview of Tell Sites

Overall, the tell settlements in the Yale Khabur Survey area are, other than on the Jebel Abd al-Aziz, remarkably evenly distributed, with only marginally more located to the north compared to the far more arid south (see Fig. 4.21). Considering only larger sites of over 10 ha provides a different picture, however, with all but one (Tell Mu'azzar) located north of the Jebel; on or above the 300 mm isohyet. Most of these are of the two-tiered fortified variety, with *ringwall settlements* being the most common type; indeed this area sees the greatest concentration of this site category in the entire GWJ. The two *true Kranzhügel* of this area are its largest settlements by a significant margin, emphasising the characteristic large scale of this site type. Though sites were identified which could not confidently be placed into a category, or where the very existence of two-tiered fortifications was unclear, no *Matin-* or *Dakhliz-variety* tells are represented here.

4.3.3. Flat Settlements

Flat settlements in this region are nearly as prevalent as tells, with 63 identified sites (see Fig. 4.21). Unlike tells however, the majority (over 70%; 46 sites) are clearly located to the north of the Jebel Abd al-Aziz. Those flat sites which do exist to the south are mostly either small settlements or fortified outposts such as military camps and fortresses of the Roman and Byzantine period (Hole & Kouchoukos 1995: 9-10). By far the largest of these, and indeed the largest site in the survey area, is the over 80-hectare Roman and Islamic-era settlement located directly to the west of Tell Mu'azzar.

4.3.4. Other Sites

Wadi Khaznah

Size: not available

Morphology: "buried site"

Visited in the field (reference): yes (Hole & Kouchoukos 1995)

Occupation periods: LC

LC occupation phases: LC 1-3

Description: Wadi Khaznah lies just under a kilometre to the southeast of Tell Khaznah, and is one of the very few locations where LC remains were discovered. The "buried site" mentioned by Hole & Kouchoukos (1995) does not appear on remote sensing data, though the wadi itself is clearly visible on satellite imagery.

Bir Mu’azzar

Size: 2 ha (Hole & Kouchoukos 1995)

Morphology: “mound”

Visited in the field (reference): yes (Hole & Kouchoukos 1995)

Occupation periods: LC

LC occupation phases: LC 1-3

Description: Bir Mu’azzar is located around 3.5 km northwest of Tell Mu’azzar, at the point where the wadi which passes that site emanates from the upland topography. Despite being described as a “mound” by Hole & Kouchoukos (1995), it is not visible by remote sensing.

Ras al-Tell

Size: 0.03 ha (von Oppenheim 1933)

Morphology: carved rock reliefs on the natural hill Jebelet al-Beidha

Visited in the field (reference): yes (Moortgat-Correns 1972; von Oppenheim 1933)

Occupation periods: EBA

EBA occupation phases: not available

Description: This highly unusual ritual site is located on the hilltop of Jebelet el-Beidha, which forms a 15 by 20-metre platform on which von Oppenheim discovered a monumental statue (plus several statue fragments) and three relief stelae depicting male human forms (see Section 2.1.2.1). The site is too small to be visible on satellite imagery, though the small *jebel* it is located on can be clearly defined.

4.3.5. Hollow Ways

The majority of the extensive hollow way network in the survey area is located north of the Jebel Abd al-Aziz, specifically in the northeastern triangle created by the mountain range and the Khabur river (see Fig. 4.22). The routeway system in this area is dense, so that many sites’ systems intersect and connect with those of nearby settlements. This also corresponds with the location of most of the large tell settlements of 10 ha and above, all of which contain hollow ways. The same is true of the two-tiered fortified tells, regardless of their size. The largest concentrations of these routes emanate from the largest sites of the area.

Hollow Way Network 4

Associated Sites: Site 36 (Tell Mabtuh Sharqi)

Occupation periods of associated sites: EBA

Number of routes emanating from the site(s): 10

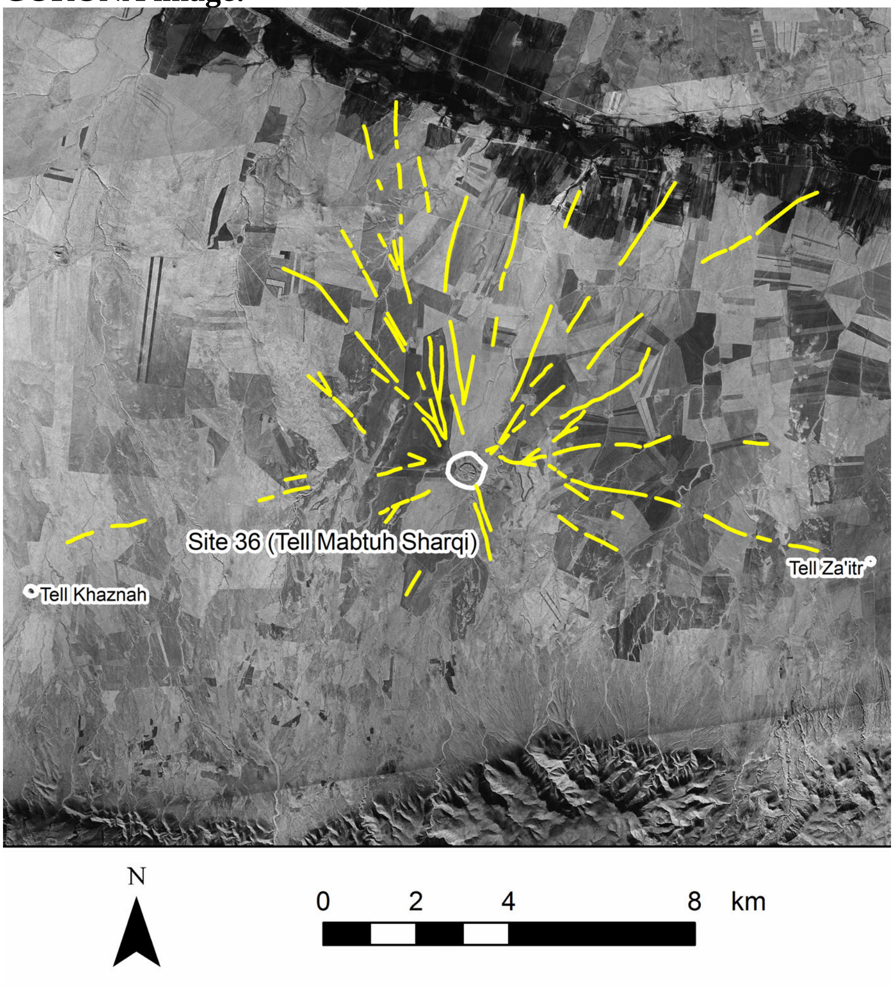
Total number of routes (after bifurcations): 25

Number connecting to other sites: 2

Furthest length of terminating routes: 7 km

Furthest length of site-connecting routes: 9 km

CORONA image:



Description: Tell Mabtuh Sharqi features the largest network of hollow ways in the survey region. All the routes leading north or northeast from this tell lead up to the Khabur, 7 km away, while those in other directions mostly peter out after a maximum of ca. 4 km. Two exceptions are one route running west-southwest to Tell Khaznah (9 km distance) and one leading east-southeast to the 1.7-hectare Tell Za'itr (8.5 km away).

Hollow Way Network 5

Associated Sites: Site 38 (Tell al-Magher)

Occupation periods of associated sites: EBA

Number of routes emanating from the site(s): 14

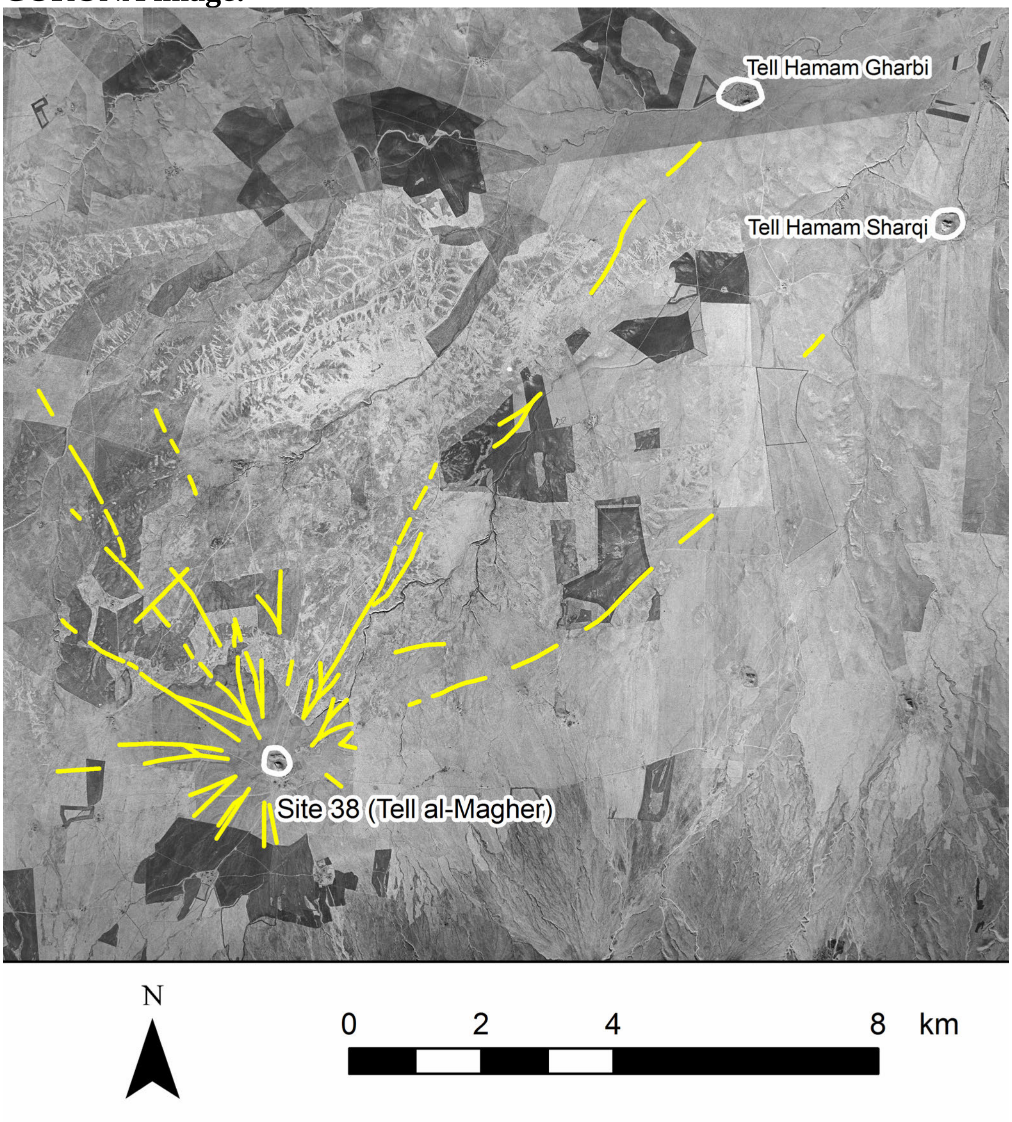
Total number of routes (after bifurcations): 26

Number connecting to other sites: 2, possibly 3

Furthest length of terminating routes: 6.5 km

Furthest length of site-connecting routes: 13 km

CORONA image:



Description: Tell al-Magher features a very evenly-spread hollow way system, with routes emanating from the site in all directions. While the majority peter out, two lead northeast to Tell Hamam Gharbi and Tell Hamam Sharqi, respectively. Furthermore, one hollow way running straight west may link up with Tell Mabtuh Gharbi, though it is too obscured on CORONA imagery to be sure.

Hollow Way Network 6

Associated Sites: Site 39 (Tell Mabtuh Gharbi)

Occupation periods of associated sites: EBA

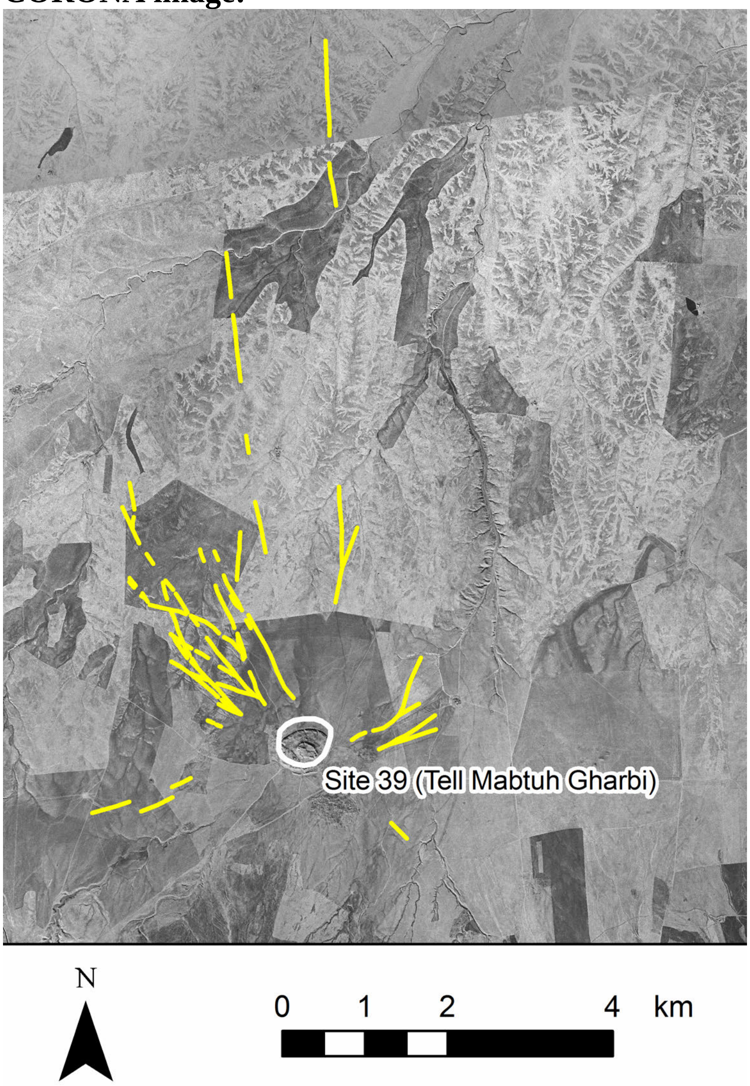
Number of routes emanating from the site(s): 9

Total number of routes (after bifurcations): 20

Number connecting to other sites: 0

Furthest length of terminating routes: 8 km

CORONA image:



Description: Over half of the routes emanating from Tell Mabtuh Gharbi lead to the northwest. While none appear to run south towards the Jebel Abd al-Aziz, this may be due to this being the location of the Neo-Assyrian Site 475, which would obscure any such routes present.

Hollow Way Network 7

Associated Sites: Site 35 (Tell Hamam Sharqi), Site 474 (Tell Hamam Gharbi)

Occupation periods of associated sites: EBA

Number of routes emanating from the site(s): 12

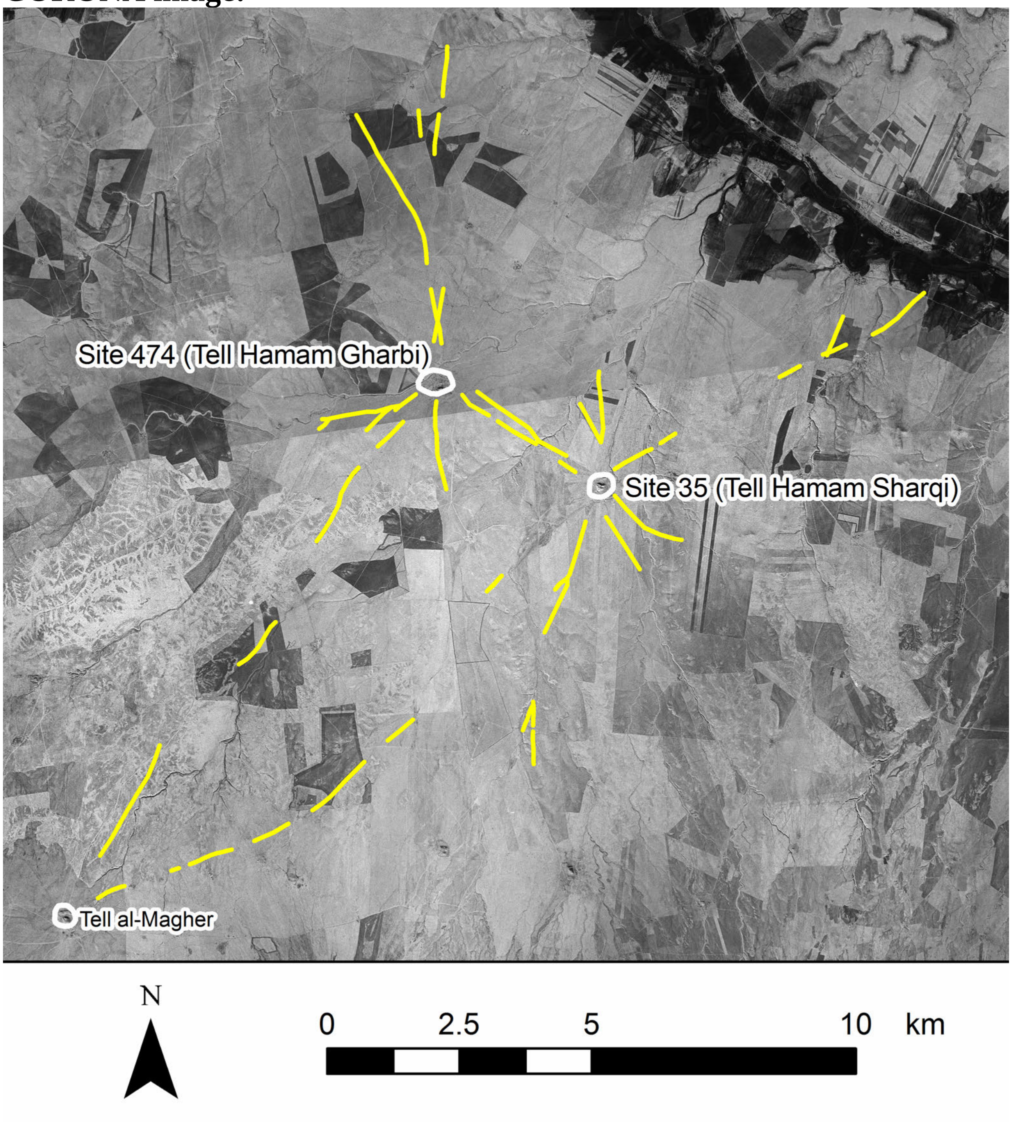
Total number of routes (after bifurcations): 20

Number connecting to other sites: 3

Furthest length of site-connecting routes: 13 km

Furthest length of terminating routes: 7 km

CORONA image:



Hollow Way Network 8

Associated Sites: Site 34

Occupation periods of associated sites: EBA

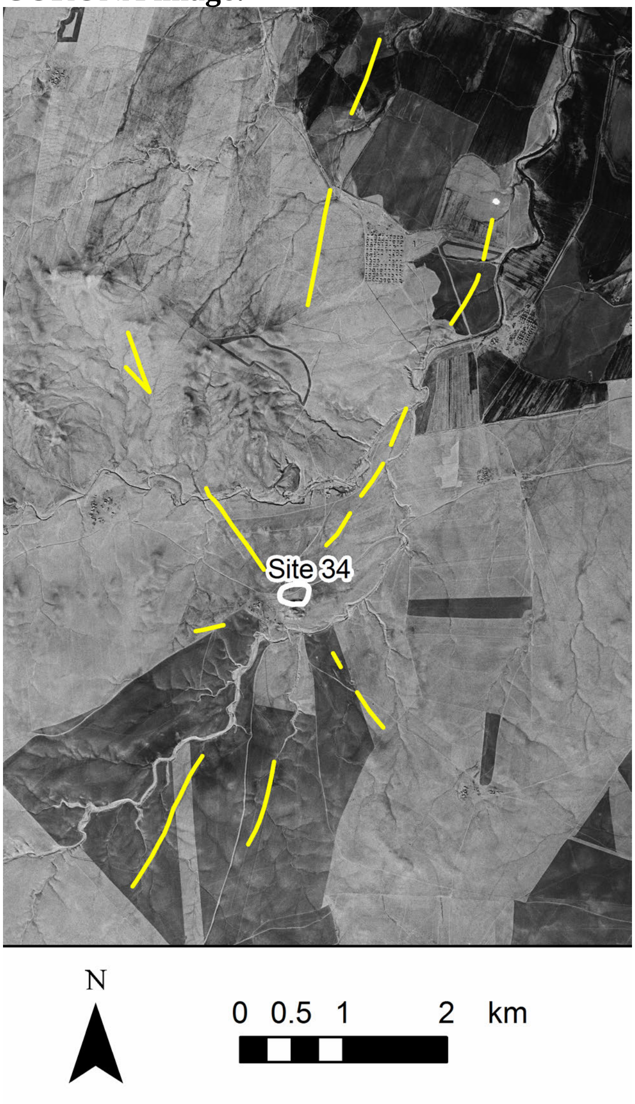
Number of routes emanating from the site(s): 7

Total number of routes (after bifurcations): 8

Number connecting to other sites: 0

Furthest length of terminating routes: 5.5 km

CORONA image:



Hollow Way Network 9

Associated Sites: Site 570 (Tell Mijdel)

Occupation periods of associated sites: not available

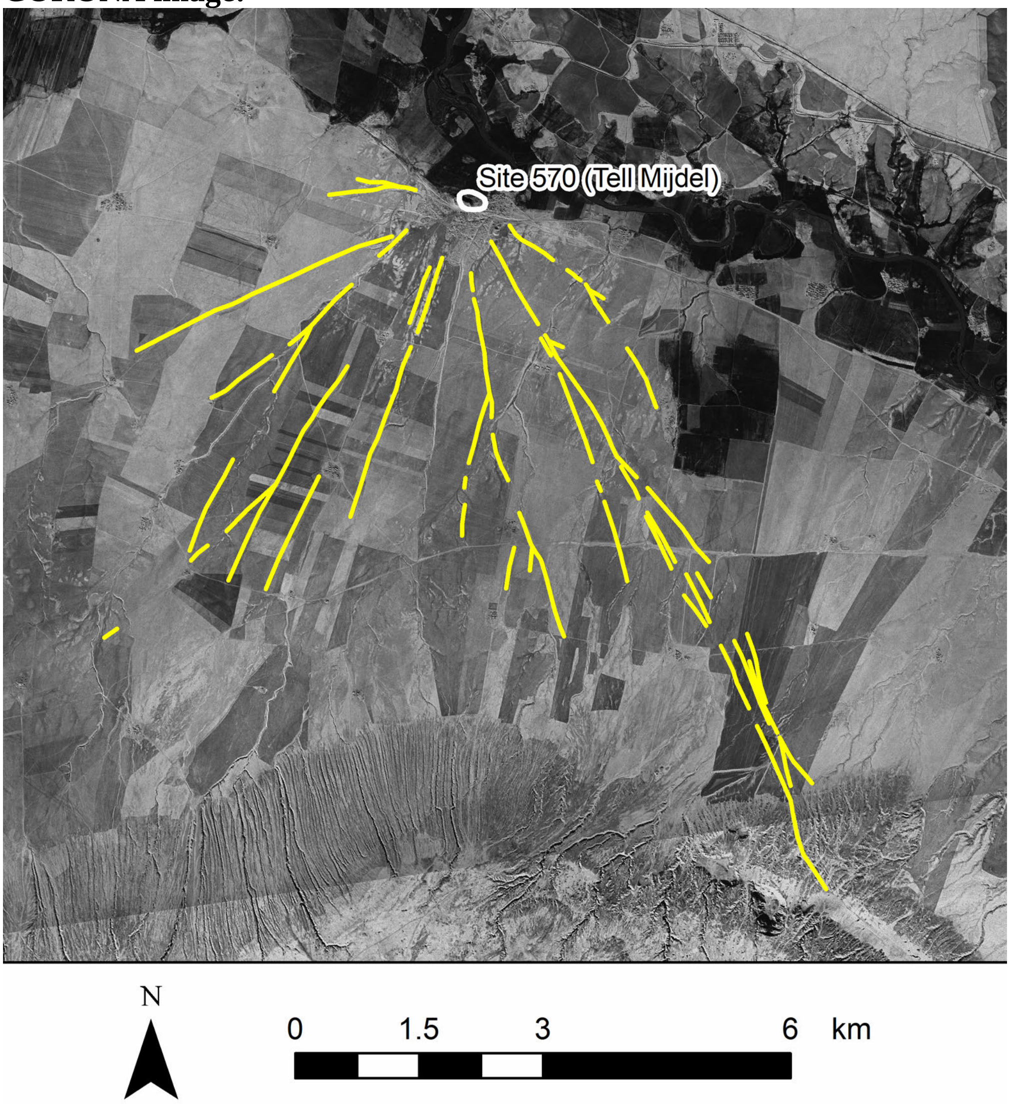
Number of routes emanating from the site(s): 7

Total number of routes (after bifurcations): 14

Number connecting to other sites: 0

Furthest length of terminating routes: 9 km

CORONA image:



Description: The hollow ways emanating from the 5.4-hectare Tell Mijdel all lead south, away from the Khabur towards the Jebel Abd al-Aziz, reaching its foothills. The landscape to the north of this tell is obscured by agriculture along both banks of the Khabur and high bluffs on its opposite bank, so potential hollow ways here would be invisible.

Hollow Way Network 10

Associated Sites: Site 41 (Tell Mu'azzar)

Occupation periods of associated sites: EBA

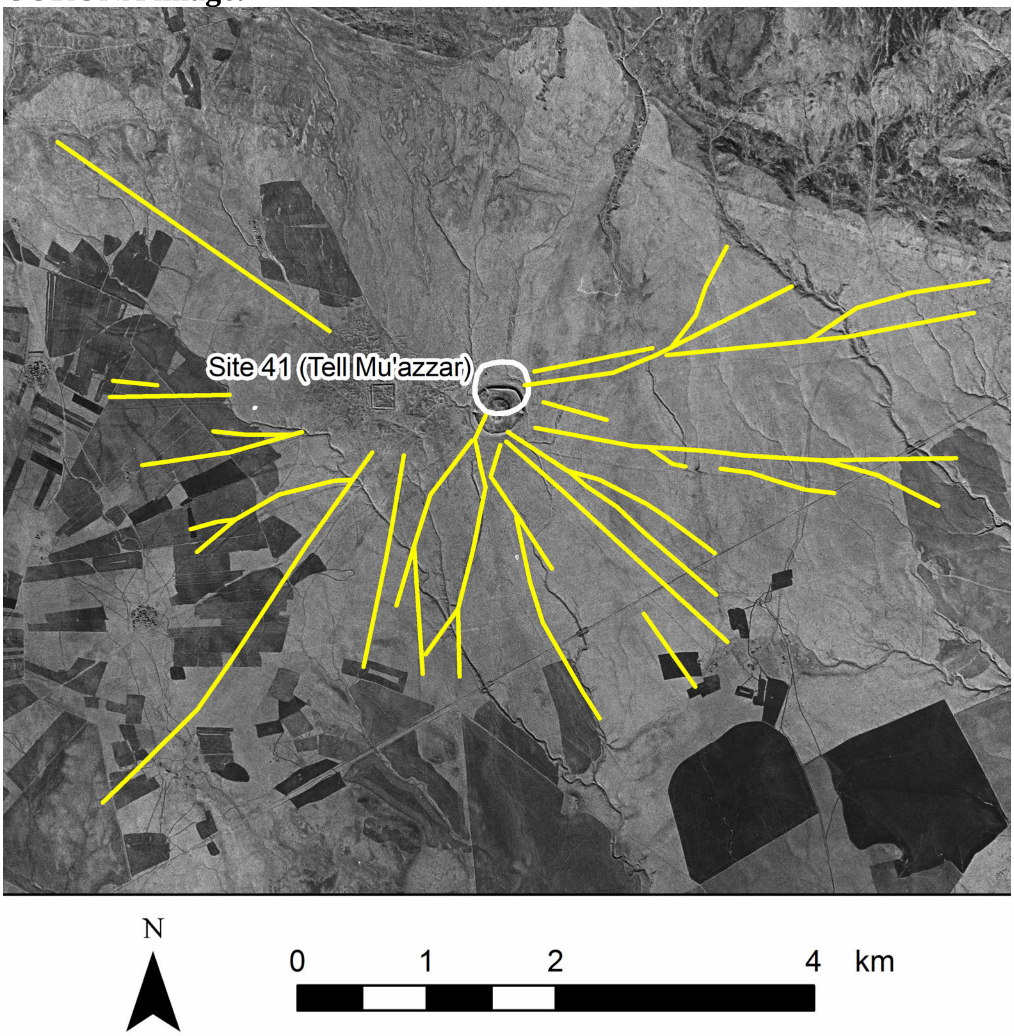
Number of routes emanating from the site(s): 8, maybe 11

Total number of routes (after bifurcations): 18, maybe 23

Number connecting to other sites: 0

Furthest length of terminating routes: 3.6 km

CORONA image:



Description: The largest network of hollow ways south of the Jebel Abd al-Aziz emanate from Tell Mu'azzar. Those to the west of this site are partially obscured by a large Roman/Byzantine and Islamic settlement, thus their identifications are more tentative.

Hollow Way Network 11

Associated Sites: Site 485 (Tell Tuainan)

Occupation periods of associated sites: EBA, Iron Age, Roman/Byzantine

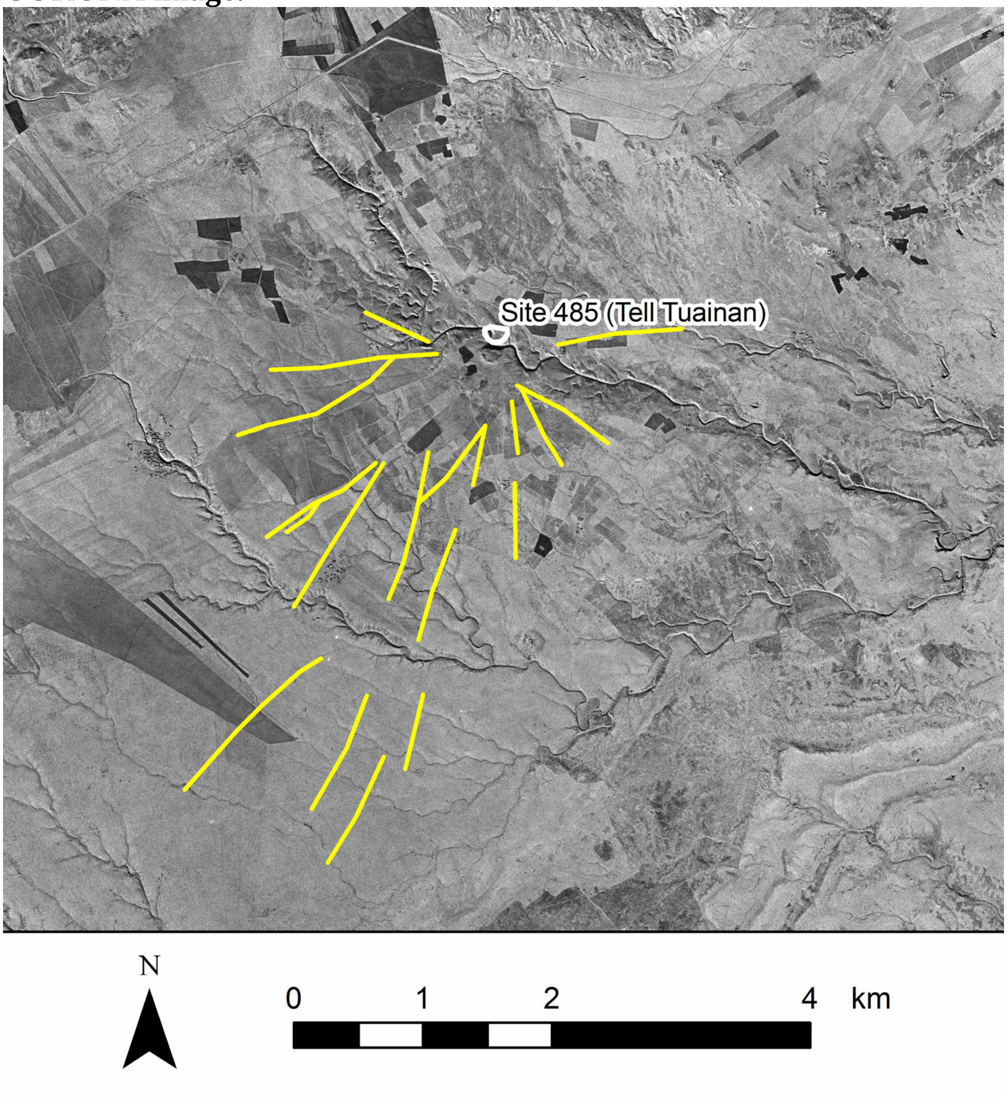
Number of routes emanating from the site(s): 8

Total number of routes (after bifurcations): 12

Number connecting to other sites: 0

Furthest length of terminating routes: 4 km

CORONA image:



Description: This network, emanating from the 1.6-hectare Tell Tuainan, extends towards all easterly and southerly directions. None, however, lead north (towards the Jebel Abd al-Aziz) or northeast, which would involve crossing a wadi. This indicates that this feature may have been impassably deep, or that two different land uses were in place either side of the wadi.

Hollow Way Network 12

Associated Sites: Site 483 (Tell Mabtu'a)

Occupation periods of associated sites: EBA, Roman/Byzantine

Number of routes emanating from the site(s): 4

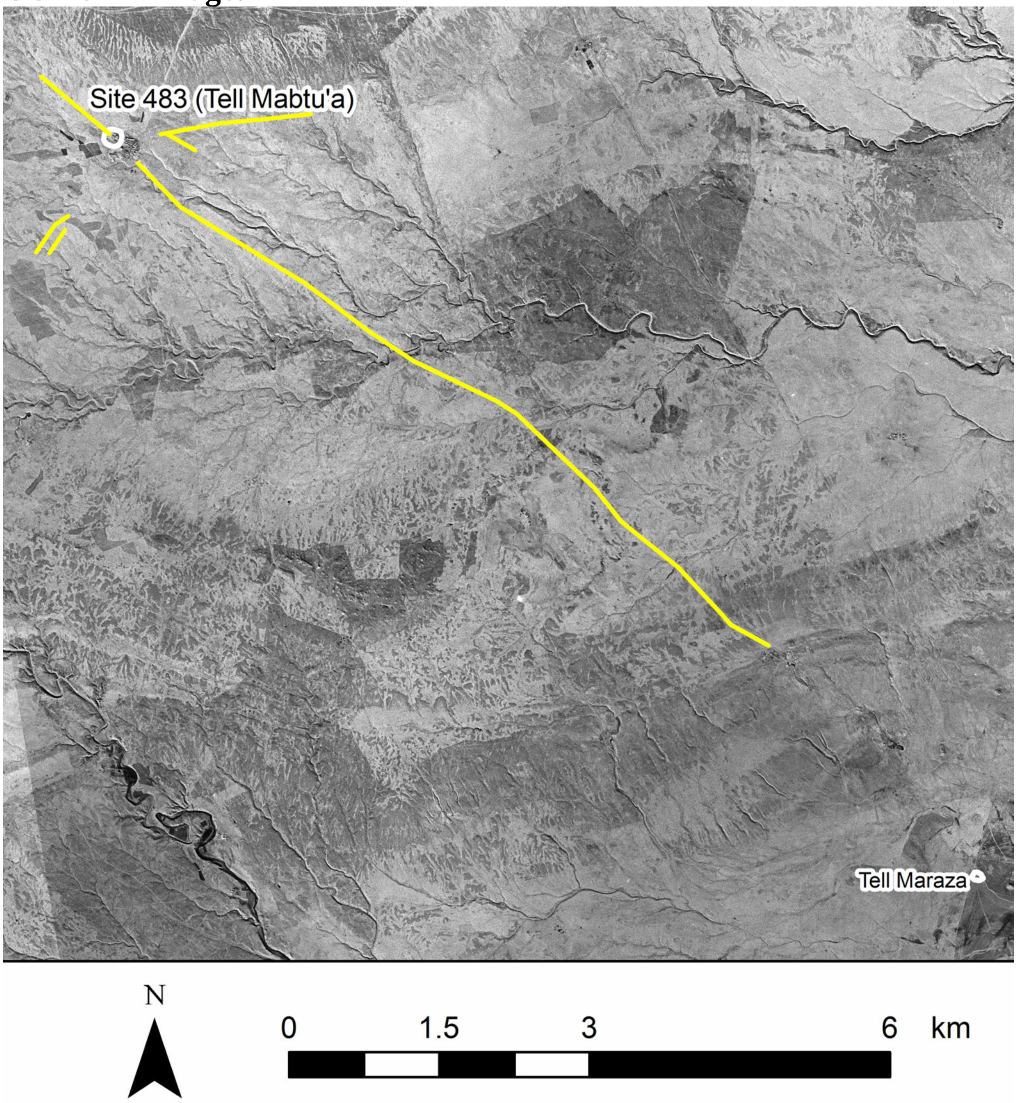
Total number of routes (after bifurcations): 6

Number connecting to other sites: 0, possibly 1

Furthest length of terminating routes: 2 km, possibly 8 km

Furthest length of site-connecting routes: if existent, 11 km

CORONA image:



Description: The routes emanating from the 2.4-hectare Tell Mabtu'a similarly do not lead north. Most peter out after no more than 2 km, however one, leading southeast, continues for 8 km. This route's great length and trajectory suggest that it potentially linked Tell Mabtu'a with Tell Maraza, located a further 3 km in the same direction.

Hollow Way Network 13

Associated Sites: Site 487 (Tell Mityaha), Site 486 (Tell Murtiya), Site 691

Occupation periods of associated sites: EBA, Iron Age, Roman/Byzantine

Number of routes emanating from the site(s): 3

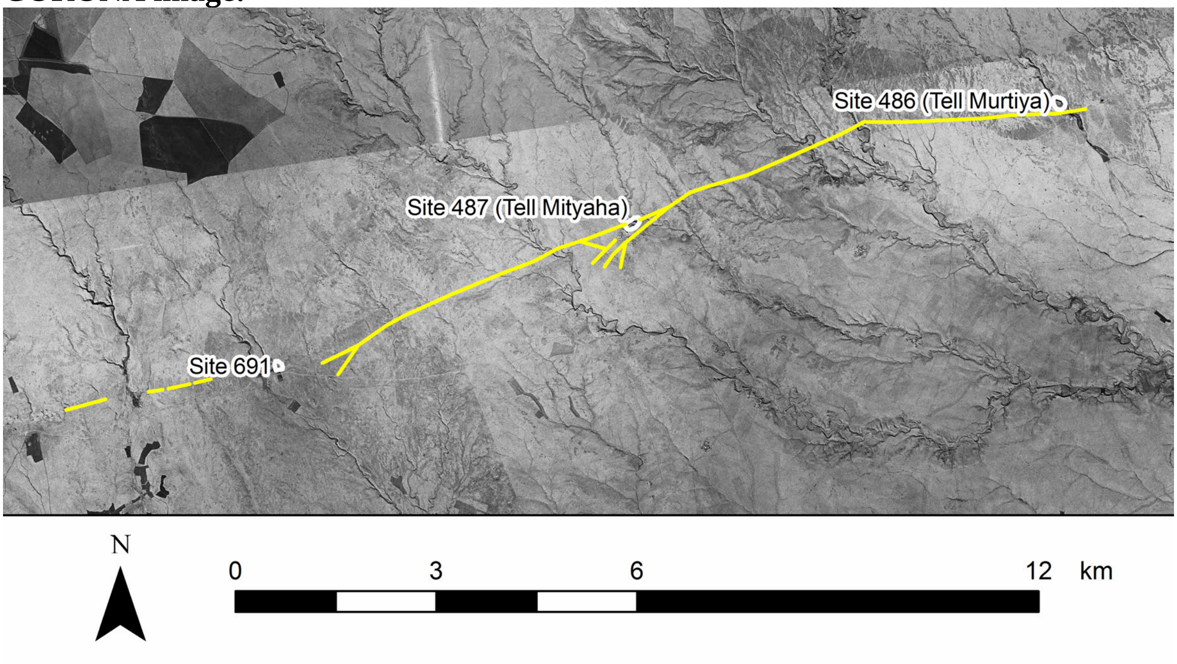
Total number of routes (after bifurcations): 4

Number connecting to other sites: 1

Furthest length of terminating routes: 0.5 km

Furthest length of site-connecting routes: at least 16 km

CORONA image:



Description: Two faint routes, bifurcating to three, emanate to the southwest from Tell Mityaha. More prominently, an east-west hollow way on which Tell Mityaha, Tell Murtiya, and the small tell Site 691 lie can be traced to a length of 16 km on CORONA imagery. The lack of feature clarity due to the nature of the mountainous terrain in the area means it could well have extended much further in either direction.

4.3.6. Combined Overview of Survey Area

The Yale Khabur Survey region sees a very even spatial distribution of settlements (see Fig. 4.21). Although some clustering of does occur along the northern and southern foothills of the Jebel Abd al-Aziz, the vicinity of the Khabur, and the top of the Wadi Hamar, the number of settlements in the northern rainfed regions is equal to those in the more arid south. Less than 10% of sites identified (all flat settlements; 11 sites; 1% of the settled area) are located on the Jebel itself, though the increased difficulties faced in both ground and remote sensing survey of upland areas might be a factor in this.

Large EBA settlements of 10 hectares and above, all but one of which are clearly of the two-tiered fortified tell type, are however definitely more prevalent in the north, with only one located south of the *jebel*. This pattern mostly coincides with the locations of this area's hollow way networks, with the only routes around smaller sites being those emanating from Tells Mityaha, Tuainan, and Mabtu'a, all situated in the more arid southern regions (see Fig. 4.22). There are no signs of any canals or qanats in this area.

Section 4.4: Wadi Hamar Survey Region

4.4.1. The Archaeological Landscape

The Wadi Hamar Survey, including its *Westerweiterung*, covers a much smaller area than either of the above two surveys; some 680 km^2. Thus the settlement patterns observed must be viewed in that context, and the very even distribution of sites largely put down the uniformity of the landscape in question, located between the 280 and 320 mm rainfall isohyets within the Wadi Hamar watershed. Only two parts of the survey area appear to show a lower than average density of settlements as identified by the survey. One is the southeastern quadrant, which although making up around a fifth of the survey area contains only 5% (6 out of 96 sites) of identified sites. This area largely lies away from close proximity to tributaries of the Wadi Hamar, though still within a maximum of 8 km from them. The other is the northwestern *Westerweiterung*, though this may be due more to discrepancies in survey methods (one person on foot over two seasons as opposed to two people by vehicle over three seasons) than any settlement patterns. Large sites of over 10 ha follow a very similar pattern, with none in the southeast quadrant and few in the *Westerweiterung* (Fig. 4.9).

With the inclusion of the additional sites identified by remote sensing, the distribution pattern of sites becomes even more uniform. Despite a persistent lower density of sites in the southeastern quadrant, it is less empty, with 8% (14 out of 166 sites) of all sites located there. The *Westerweiterung*, meanwhile, sees a density pattern on a par with the remainder of the survey area. Sites of over 10 ha become more evenly distributed with regard to quadrants of the survey; however the western end of the *Westerweiterung* remains fairly empty. Additionally, a new pattern emerges: over 80% (23 out of 28 large sites) are located in the northern half of the survey area (Fig. 4.10).

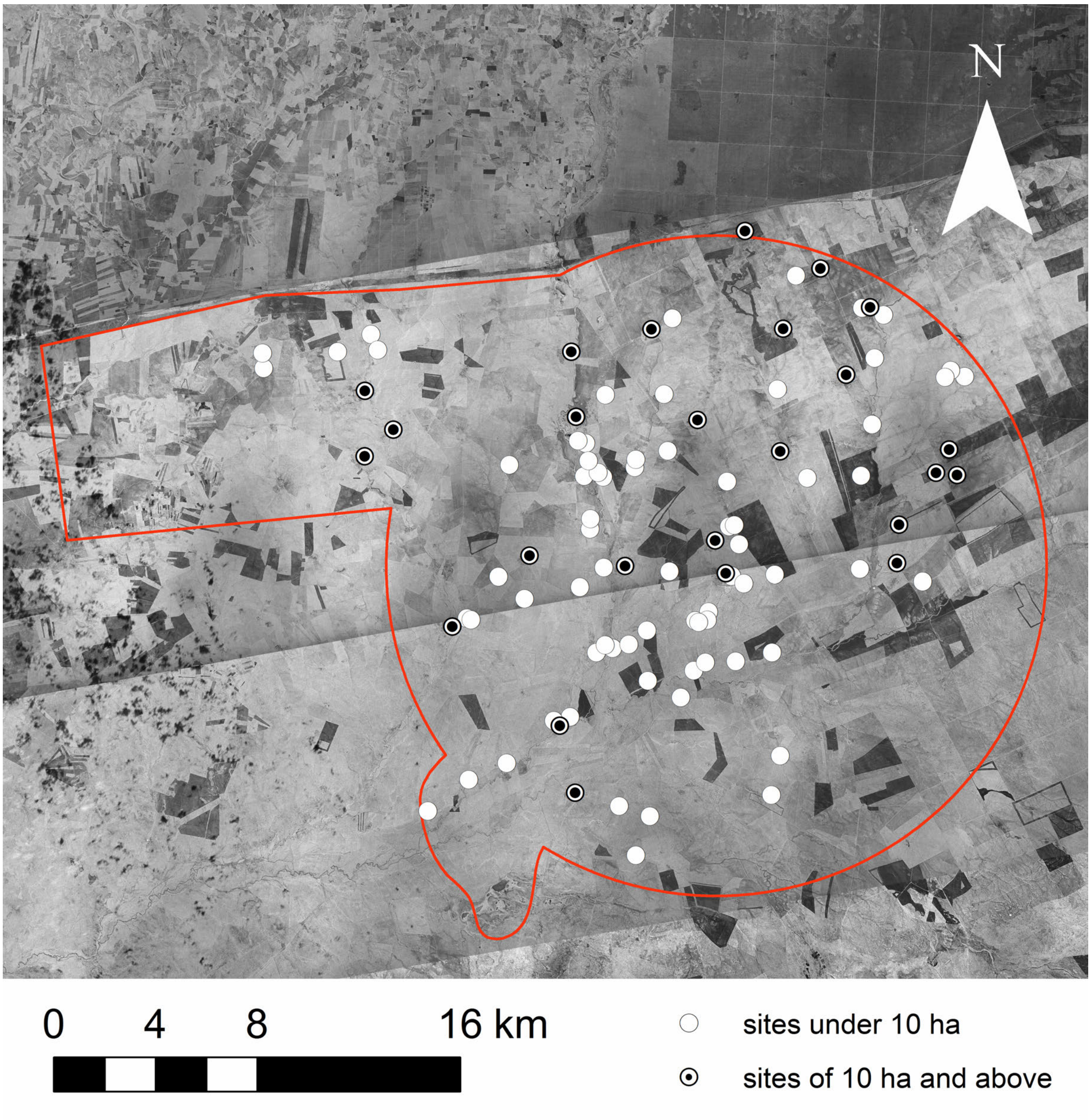


Figure 4.9: CORONA image (Mission 1105-1) of the Wadi Hamar Survey area showing all sites identified by the ground survey.

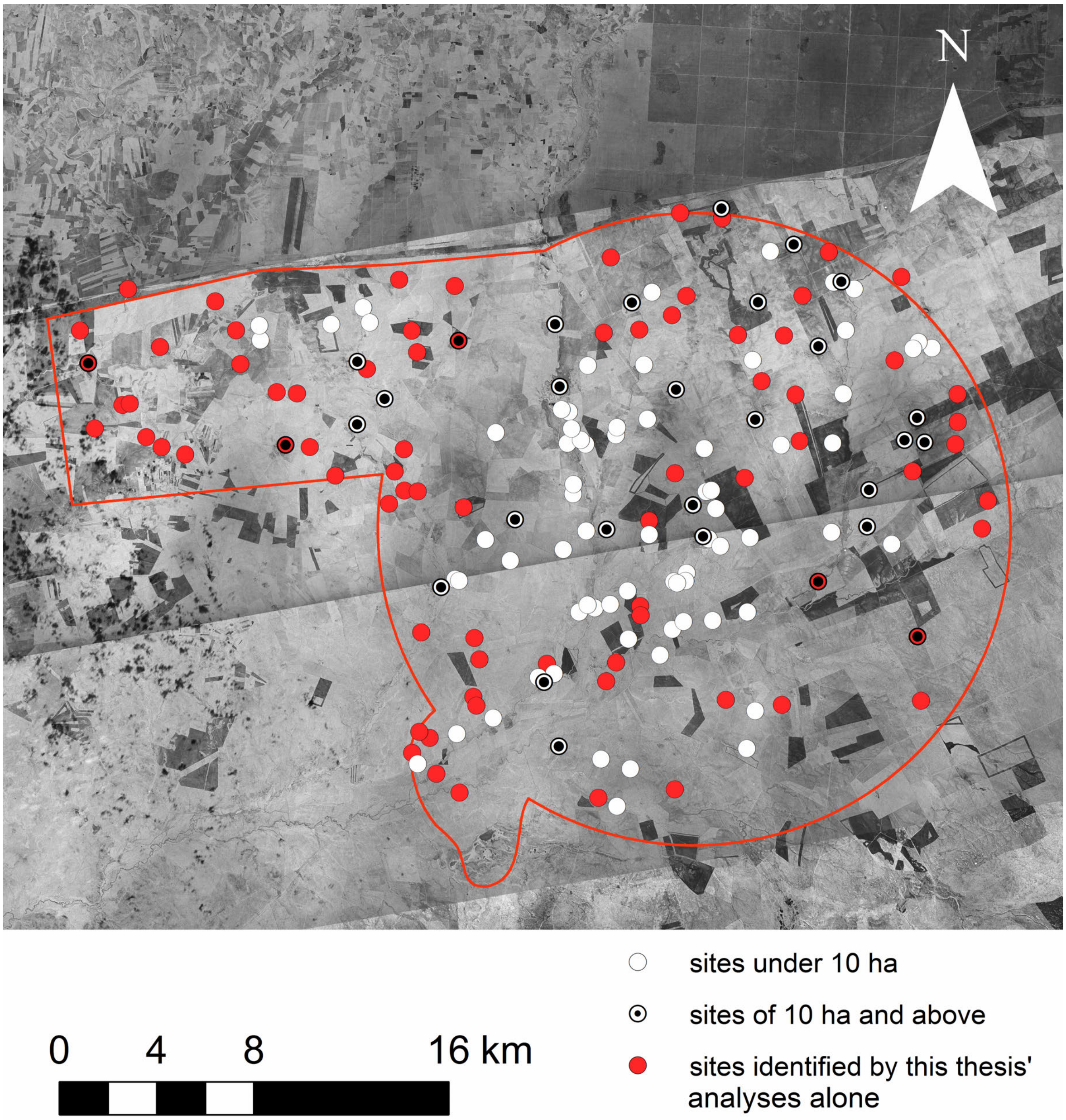


Figure 4.10: CORONA image of the Wadi Hamar Survey area showing all sites identified by both the ground survey and the remote sensing survey.

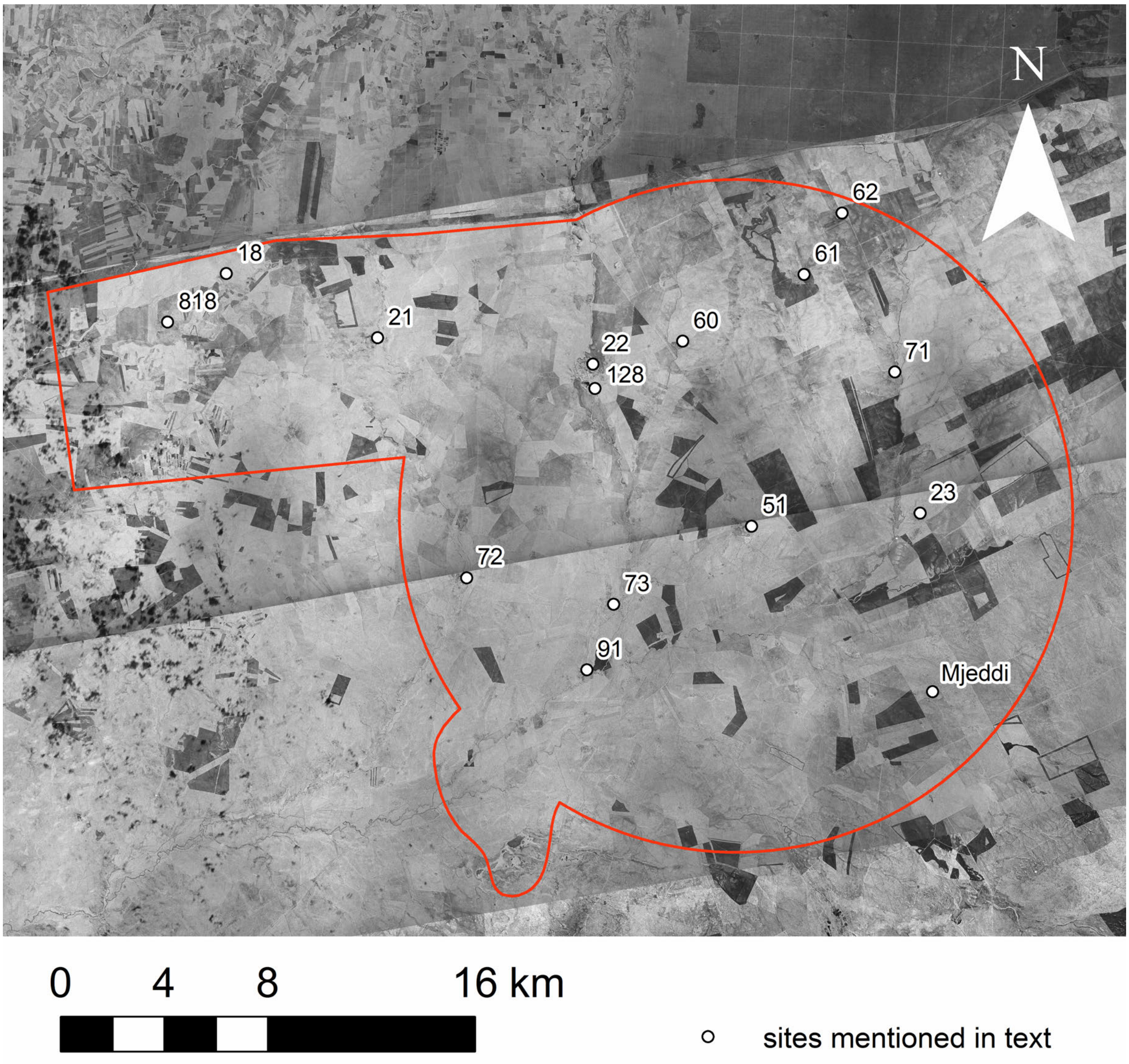


Figure 4.11: CORONA image of the Wadi Hamar Survey showing all sites mentioned in text, by this thesis' numbering system.

4.4.2. Tell Sites

4.4.2.1. Two-Tiered Fortified Tells

The main tell settlement in this area is the *true Kranzhügel* Tell Chuera, while one other settlement is represented by this site category also. Meanwhile one site is tentatively classed as a *ringwall settlement*, while a further tell is the *Dakhliz variety* type-site.

Site 22 (Tell Chuera)

Size: 68 ha (measured on CORONA), possibly 80 ha (Meyer & Orthmann 2013)[76]

Morphology: sub-circular *true Kranzhügel* with a central depression

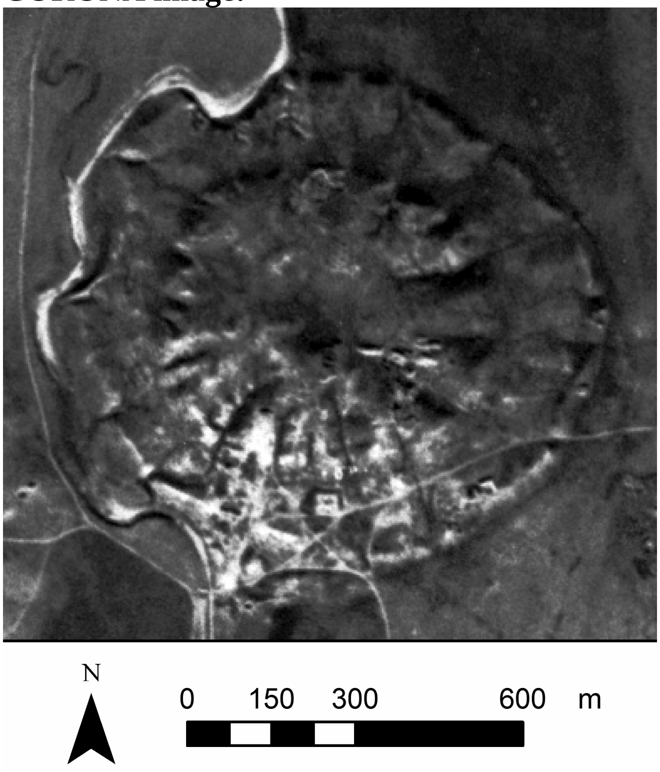
Visited in the field (reference): yes (Kühne & Schneider 1988; Meyer [ed.] 2010; von Oppenheim in Moortgat-Correns 1972; Kudlek raw data)

Occupation periods: Halaf, Ubaid, LC, EBA, LBA

LC occupation phases: LC 1-2

EBA occupation phases: EJZ 0-4c/5

CORONA image:



Description: Located 6 km south of the Turkish border, Tell Chuera is situated on the most prominent branch of the Wadi Hamar, the Wadi Chuera, which originates some

[76] The size of Tell Chuera has been reported as various values between 65 ha and 90 ha. From maps and satellite imagery, it most likely falls in the lower end of this range. Creekmore (2008: 245 fn. 12) surmises that the larger estimates were calculated based on the site’s diameter without accounting for its shape, or derive from the inclusion of extramural features in the figure.

40 km to the north in the Taurus Mountains of southern Turkey. This wadi has, since the site's occupation, incised fairly significantly into its western side, eroding its original shape, particularly to the northwest. Nevertheless, the site is probably the second-largest tell of the entire region, even when using more conservative size estimates. The outside edges of its circular central mound are deeply incised with a large number of weathered gulleys. The outer town wall is interspersed by a large number of gaps, some confirmed to be city gates. Several of these appear to align with the gulleys in the upper town, indicating the radial street network confirmed by excavations and geomagnetic prospection (see Meyer 2010b). Hollow ways are traceable emanating from Tell Chuera, particularly to the northeast, though they are all fairly faint, especially for a site that saw continuous occupation for nearly a millennium. A very prominent qanat runs close to the site's northeastern edge, touching the tell at its easternmost side.

Site 21 (Tell Ghajar al-Kebir)

Size: 20 ha

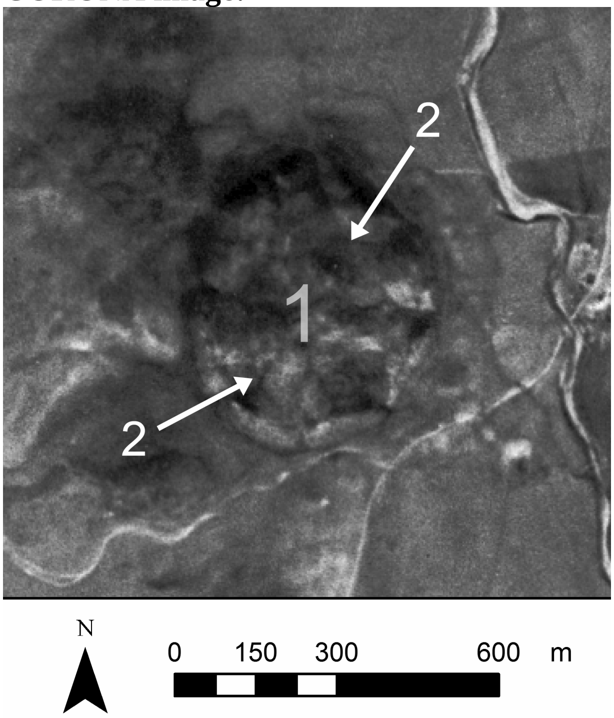
Morphology: elliptical *true Kranzhügel* with a central depression

Visited in the field (reference): yes (Kudlek 2006; Kühne & Schneider 1988; Kudlek raw data)

Occupation periods: EBA, MBA, LBA, Iron Age, Roman/Byzantine, Islamic era

EBA occupation phases: not available

CORONA image:



Description: Tell Ghajar al-Kebir is located 8 km northwest of Tell Chuera, and is similarly situated on a major branch of the Wadi Hamar; the Wadi Dakhliz. Its central mound [1] is only very faintly distinguishable from its lower town [2]. A depression is evident in its centre, as well as faint radial gulleys, with one clearer one to the west. Eight gaps are clearly discernible in the site’s outer wall, which appear to be evenly spaced at 45-degree intervals. As with Tell Chuera, hollow ways emanate from this site, but very faintly. These seem to be exclusively located to the north and northeast; however the natural undulation of the landscape immediately to the west of Tell Ghajar al-Kebir would probably obscure any existent hollow ways in that area.

Site 72 (Tell Dakhliz)

Size: 23 ha

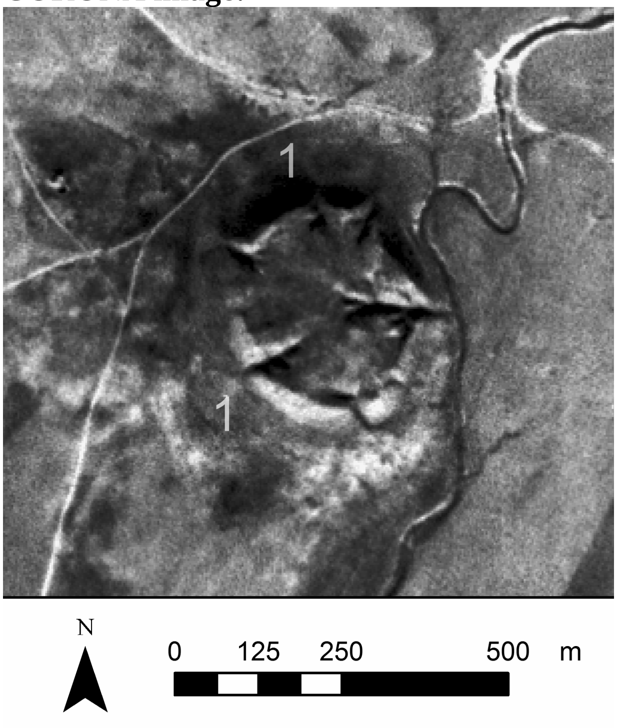
Morphology: elliptical *Dakhliz-variety* tell with no central depression

Visited in the field (reference): yes (Hempelmann 2013; Kudlek 2006; Kühne & Schneider 1988; Pruß 2005; Kudlek raw data)

Occupation periods: EBA, Iron Age

EBA occupation phases: EJZ 0-4a

CORONA image:



Description: Tell Dakhliz is located 10 km southeast of Tell Ghajar al-Kebir, downstream on the Wadi Dakhliz. Its upper town wall features gaps which coincide with deep weathering gulleys. One such gap in particular, to the east and facing the wadi, features a gulley that incises across half of the entire site. The clear “halo” of undulating surface that surrounds this site [1] indicates intensive human activity, something confirmed by Kudlek (pers. comm. 16/05/2014).

Site 818

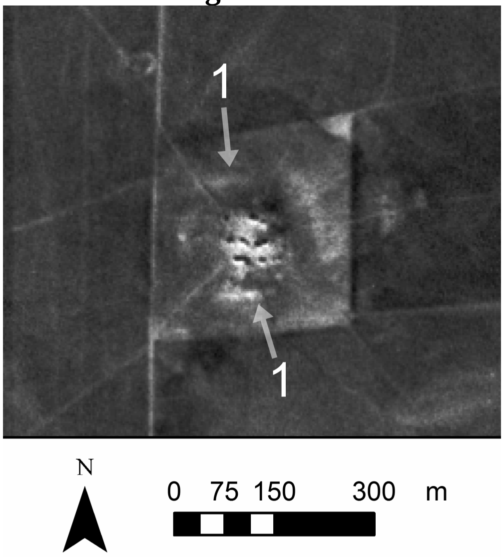
Size: 4 ha

Morphology: probable circular *ringwall settlement* with no central depression

Visited in the field: no

Occupation periods: not available

CORONA image:



Description: This site is located eight kilometres west of Tell Ghajar al-Kebir and features a central circular low mound confirmed by DEM. Its outer town wall, however, is not visible as an elevation, but instead a light-shaded intermittent circle that curves around the central mound [1]. The gaps between the individual segments of this probable wall are very distinct, indicating city gates; especially as several of the very faint hollow ways that emanate from this site to the east seem to originate from these gaps. The closest analogy to this site is Site 408 in the *Westjazira* Survey region (see Section 4.2.2.1), however that feature appears much clearer on satellite imagery. Thus Site 818 is tentatively classed as a *ringwall settlement*, though its lack of clarity makes this conclusion preliminary only.

4.4.2.2. Other Tells

The remainder of tells in the survey area are mostly clustered around branches of the Wadi Hamar to the west and northeast. Of the 28 probable normal tells identified, only two are located in the southeastern region and two further in the *Westerweiterung*. The sizes of these sites vary by a similar amount as those in the Yale Khabur Survey area, with the smallest measuring around 0.5 ha and the largest over 34 ha.

Site 51 (Tell Kharab Sayyar)

Size: 3.5 ha

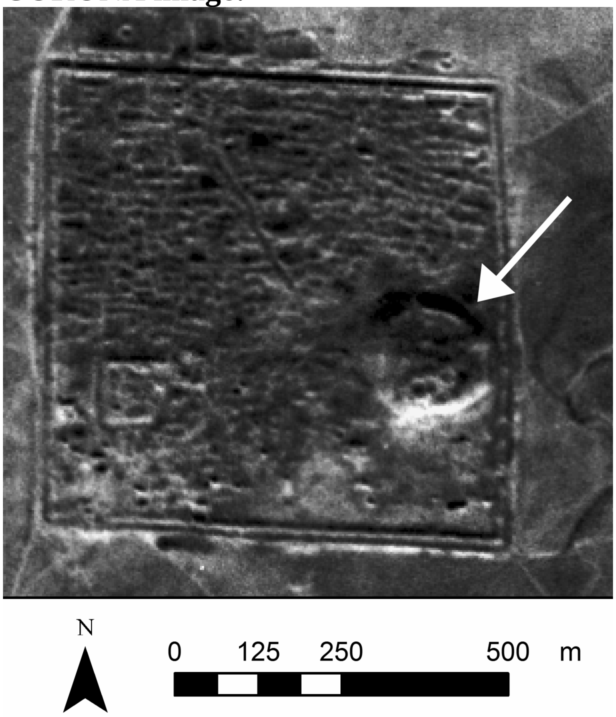
Morphology: circular truncated conical tell

Visited in the field (reference): yes (Hempelmann 2013; Kudlek 2006; Meyer *et al.* 2001, 2003, 2005; Kudlek raw data)

Occupation periods: Halaf, EBA, Islamic era

EBA occupation phases: EJZ 0, EJZ 2-3a

CORONA image:



Description: Tell Kharab Sayyar is located 8 km southeast of Tell Chuera on a minor branch of the Wadi Hamar, and is entirely enclosed by a later Islamic-era settlement. From several seasons of excavations it is known that this site featured a two-phase defensive city wall (Section 2.1.3.2). It does not, however exhibit any of the characteristics of two-tiered tells.

Site 23 (‘Ajila)

Size: 34 ha (measured on CORONA), possibly only 17.5 ha (Hempelmann 2013)

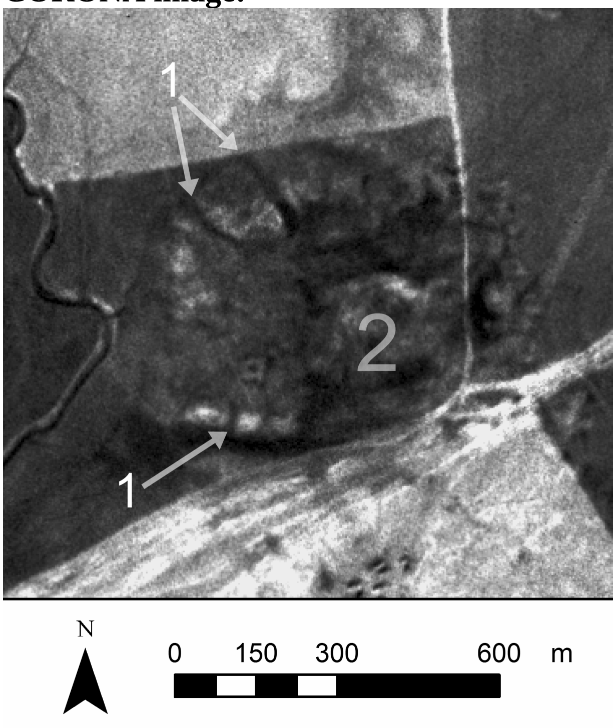
Morphology: elliptical low tell

Visited in the field (reference): yes (Hempelmann 2013; Kudlek raw data)

Occupation periods: Halaf, Ubaid, EBA, MBA, possible later occupation

EBA occupation phases: EJZ 0-1

CORONA image:



Description: ‘Ajila is the largest tell without two-tiered fortifications in the survey area, particularly notable given its short-lived EBA occupation. Located 14 km southeast of Tell Chuera, it is situated on a major branch of the Wadi Hamar, the Wadi Adwanih. It appears as a heavily undulating surface, its mounded morphology apparent due to the existence of numerous gouged-out run-off gulleys, all emanating outwards [1]. There also appears to be a high point in the southeastern portion of the tell [2]. A single small square structure, presumably of later period than the site itself, is visible in its southwestern area.

Site 62 (Msherifa)

Size: 12 ha (measured on CORONA), possibly 14 ha (Kudlek 2006)

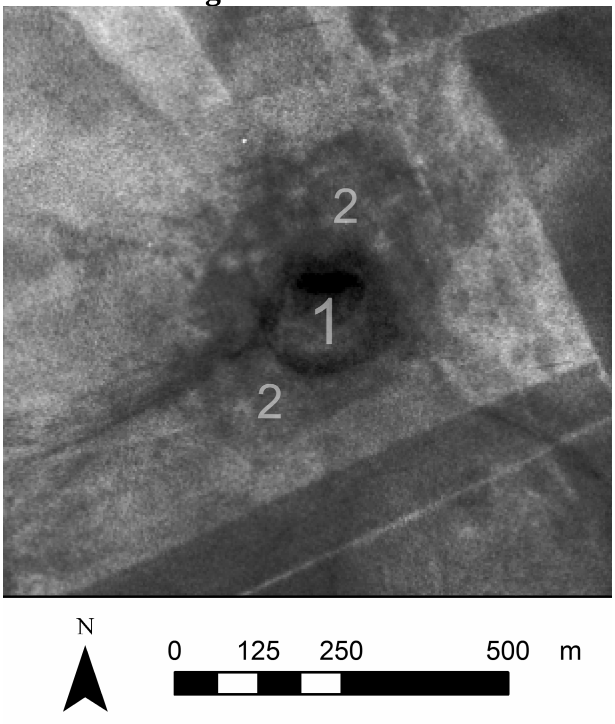
Morphology: circular low tell with an elliptical lower town

Visited in the field (reference): yes (Becker 2004; Kudlek 2006; Kudlek raw data)

Occupation periods: Halaf, EBA, Iron Age

EBA occupation phases: not available

CORONA image:



Description: Located in the far northeastern section of the survey area, under 3 km from the Turkish border, Msherifa is situated close to two branches of the Wadi Hamar. This tell [1] is surrounded by an irregular elliptical lower town, visible as a strongly undulating surface [2], however there are no indications of any two-tiered fortifications. Features that could potentially be hollow ways emanate from the site in all directions.

Site 61 (Tell Harubi)

Size: 12 ha (measured on CORONA), possibly only 4 ha (Kudlek 2006)

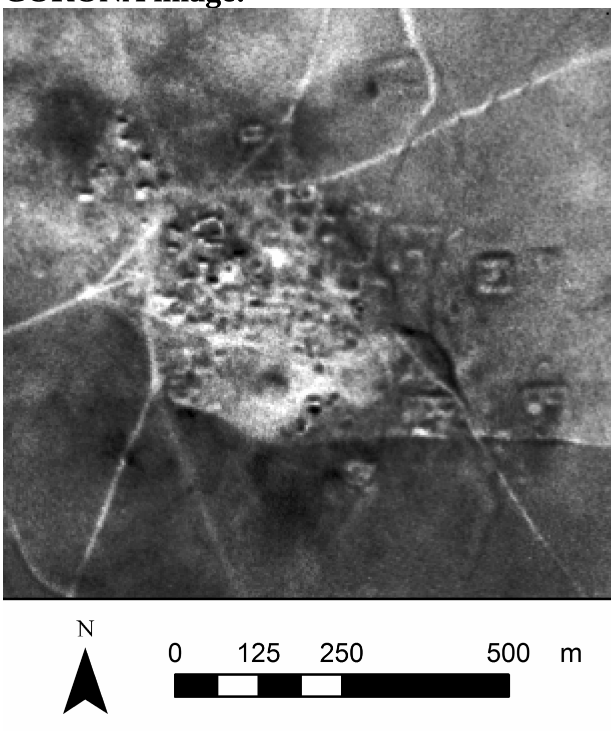
Morphology: sub-circular low mound

Visited in the field (reference): yes (Becker 2004; Kudlek 2006; Kudlek raw data)

Occupation periods: Halaf, Ubaid, EBA, Iron Age, Islamic era

EBA occupation phases: not available

CORONA image:



Description: Tell Harubi is located 2.5 km southwest of Msherifa, a few hundred metres to the east of a minor branch of the Wadi Hamar. The precise size of this tell is unclear due to the presence of an Islamic-era settlement covering the entire site. It is however one of the few larger sites in the survey area to contain evidence for both Halaf and Ubaid occupation (Becker 2004: Abb. 3). The Islamic-era settlement that supersedes the site extends beyond the tell over an area of more than 30 ha.

Site 60 (Khirbet al-Ftaim)

Size: 10 ha

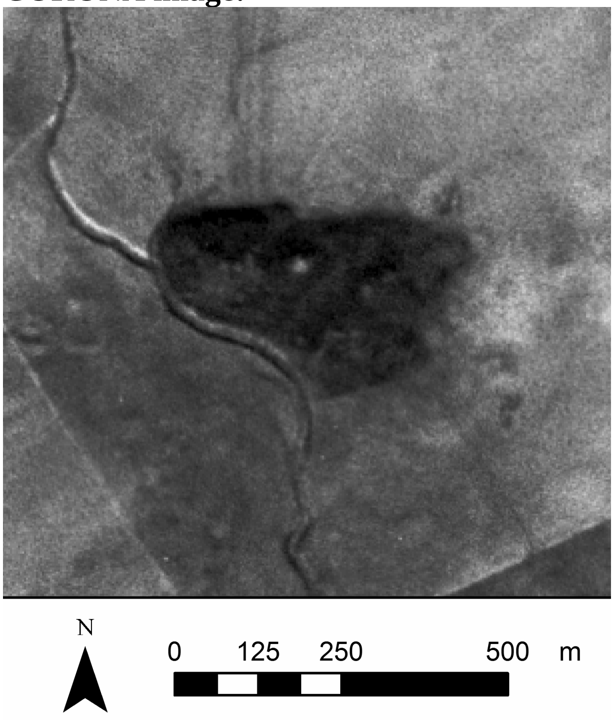
Morphology: irregular very low tell

Visited in the field (reference): yes (Kudlek 2006; Kudlek raw data)

Occupation periods: EBA, LBA, Iron Age

EBA occupation phases: not available

CORONA image:



Description: Khirbet al-Ftaim lies 3 km east of Tell Chuera on a medium-sized branch of the Wadi Hamar, the Wadi Umm Jurn. This site appears as a flat settlement on satellite imagery, however it was identified as a tell on the ground (Kudlek 2006: 31). It is of very irregular shape, and its western edge has been eroded by the wadi. However it appears clearly as a dark patch of strongly undulating surface on CORONA imagery. This site is one of only five sites surveyed to contain evidence for LBA occupation.

Site 18

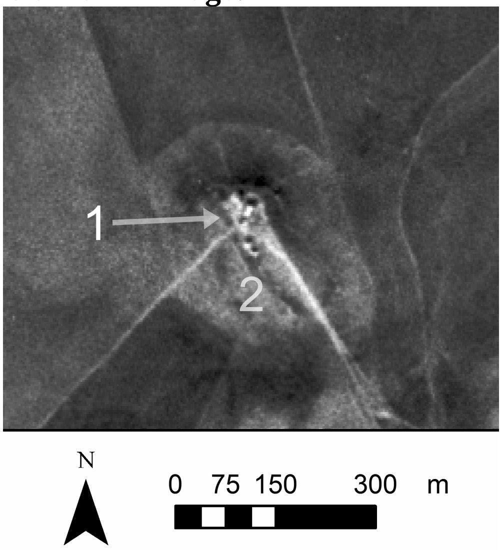
Size: 7.2 ha

Morphology: elliptical low tell with a lower town

Visited in the field: no

Occupation periods: not available

CORONA image:



Description: Site 18 is located in the northern section of the *Westerweiterung* of the Wadi Hamar Survey. It comprises a 1.6-hectare slightly elliptical central low mound [1] around which extends a clear lower town with an undulating light-shaded surface [2], however with no apparent surrounding walls.

Site 91 (Tell Tawila)

Size: 8 ha (measured on CORONA), possibly 12 ha (Hempelmann 2013), possibly only 5 ha (Becker 2004)

Morphology: low mounded tell

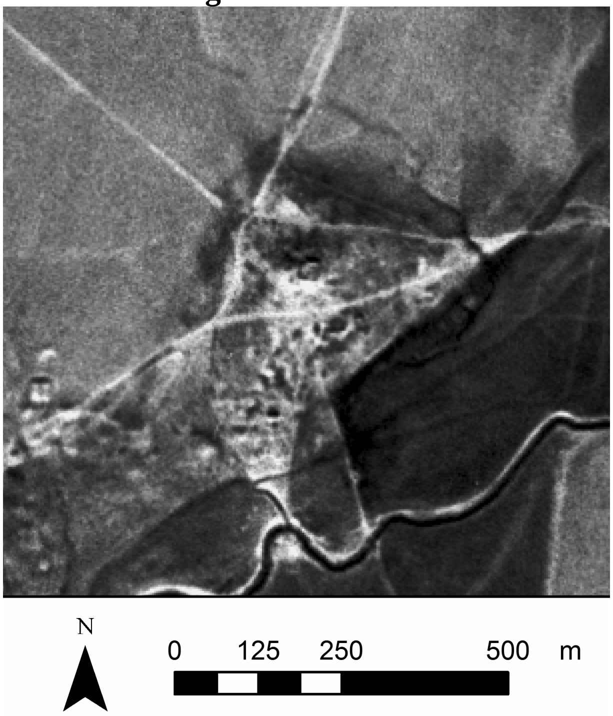
Visited in the field (reference): yes (Becker 2004; Becker *et al.* 2007; Hempelmann 2013; Kudlek 2006; Kudlek raw data)

Occupation periods: Halaf, Ubaid, LC, EBA, Iron Age, Islamic era

LC occupation phases: LC 1-2

EBA occupation phases: EJZ 0-1

CORONA image:



Description: Tell Tawila is one of the most significant settlements of the Halaf and Ubaid periods in the Wadi Hamar Survey, but also contains LC and EBA occupation (Section 2.1.3.3). It appears as a heavily obscured tell on satellite imagery, covered by a later Islamic-era settlement and the location of a modern crossroads. Excavations at this site have shown it to have a long occupation history, with each period being discrete; interspersed by a hiatus even if temporally adjacent.

Site 73 (Tell Zaidi)

Size: 5.1 ha

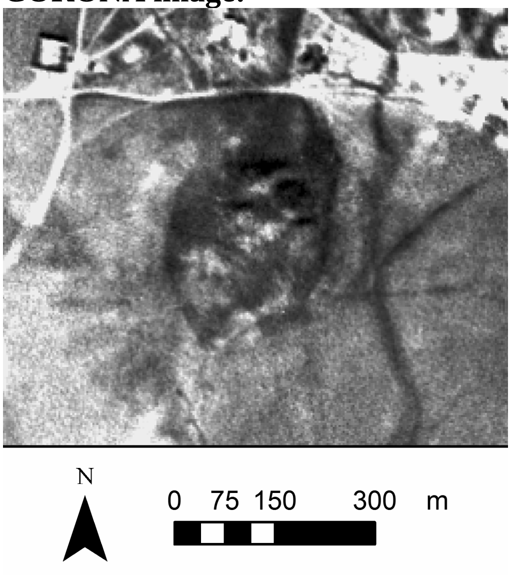
Morphology: elliptical conical tell

Visited in the field (reference): yes (Hempelmann 2013; Kudlek raw data)

Occupation periods: Halaf, EBA, LBA, Iron Age, Islamic era

EBA occupation phases: EJZ 0-1

CORONA image:



Description: Tell Zaidi is located 2.5 km from Tell Tawila on the same wadi. Very distinct hollow ways are visible on CORONA imagery emanating to the site's east, one of them leading to Kharab Sayyar.

4.4.2.3. Combined Overview of Tell Sites

The tell sites of the Wadi Hamar Survey are mostly located along tributaries of that watercourse, with only around 25% located away from these. Along the various wadis, the distribution is fairly even, with tells spaced at a distance of between 3 and 5 km. When one considers only large sites of over 10 ha, this distribution pattern appears to become dependent on site structure, with all four two-tiered fortified tells located on wadis, and all but two (Tell Kharab Sayyar and 'Ajila, representing only 7%) of the normal tells away from these. The number of large tells of the two-tiered fortified and regular variety is roughly equal. While the only probable *ringwall settlement* in the survey area is unusually small, the *true Kranzhügel* and *Dakhliz-variety* tells all measure at least 20 ha. However, it is clearly Tell Chuera that dominates this region, with no other settlement of any type larger than half its size.

4.4.3. Flat Settlements

By far the most numerous and evenly distributed site type in the Wadi Hamar Survey are flat settlements. A total of 138 such sites were identified, ranging from 0.2 to 55 ha in size. Although the southeastern quadrant of the area remains less densely occupied, they are distributed across its entirety, with only a slight clustering along wadis. Such a dense flat settlement pattern when compared to the other two survey areas is indicative of the large amount of Roman/Byzantine and Islamic-era settlement in the region, to which the majority of these date (Meyer 2010a: 15). However, some show evidence of occupation during earlier periods, and one (below) contains remains from the EBA.

Site 71 (Khirbet Ahmed al-Sibn)

Size: 3 ha

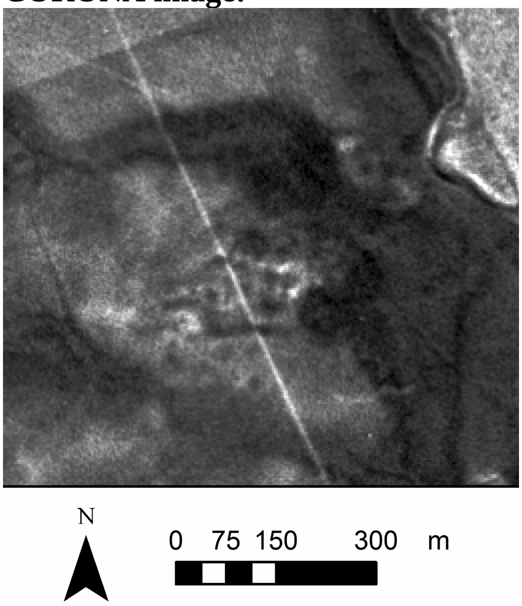
Morphology: elliptical flat settlement

Visited in the field (reference): yes (Becker 2004; Kudlek raw data)

Occupation periods: Halaf, Ubaid, EBA, Islamic era

EBA occupation phases: not available

CORONA image:



Description: Khirbet Ahmed al-Sibn is located in the northeast of the survey area, adjacent to a major branch of the Wadi Hamar. It has a long but intermittent settlement history, with each of the occupation periods separated by a hiatus of varying length.

4.4.4. Other Sites

Mjeddi

Size: 1 ha (Hempelmann 2013)

Height: 2 m (Hempelmann 2013)

Morphology: low mound

Visited in the field (reference): yes (Hempelmann 2013; Kudlek raw data)

Occupation periods: EBA

EBA occupation phases: EJZ 0-1

Description: The very small Tell Mjeddi, located 18 km southeast of Tell Chuera on the Wadi Hamar, is an unusual settlement. On the ground, it appears as a low mound; however it is all but invisible on satellite imagery. Magnetometry surveys of Mjeddi have revealed it to be a circular site with an enclosing wall of no obvious use as a fortification due to the large regular gaps in it, which form several clear axes that evenly align with points on a compass (Meyer 2010a). Mjeddi was apparently both founded and abandoned within no more than 250 years (Hempelmann 2013: 161, 190).

4.4.5. Inter-site Features

4.4.5.1. Hollow Ways

The Wadi Hamar Survey area contains relatively few visible hollow ways, with a distribution far less dense than the area immediately north of the Jebel Abd al-Aziz (see Fig. 4.22).

Hollow Way Network 14

Associated Sites: Site 22 (Tell Chuera)

Occupation periods of associated sites: Halaf, Ubaid, LC, EBA, LBA

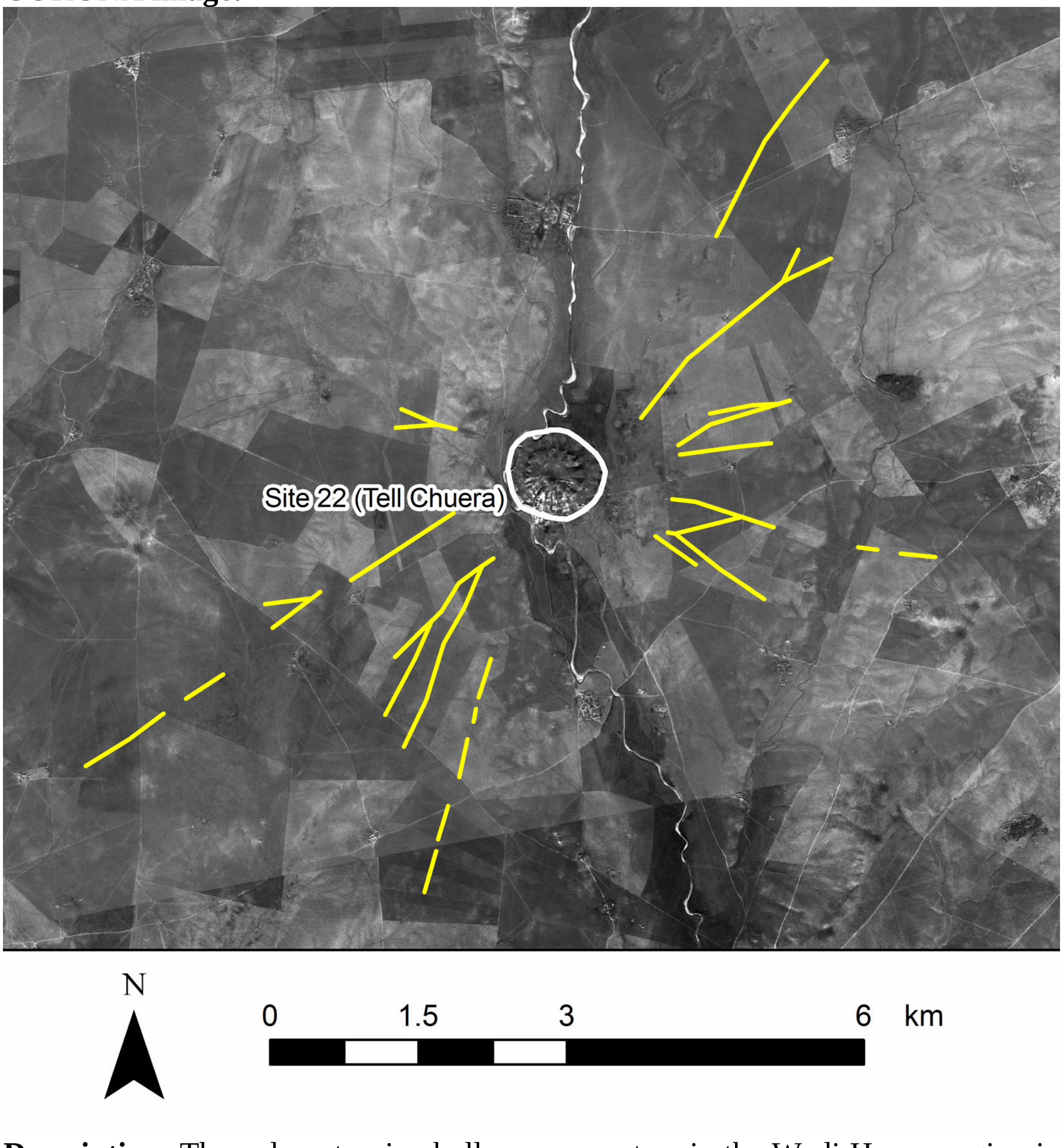
Number of routes emanating from the site(s): 7

Total number of routes (after bifurcations): 14

Number connecting to other sites: probably 0

Furthest length of terminating routes: 5 km

CORONA image:



Description: The only extensive hollow way system in the Wadi Hamar region is that around Tell Chuera, but for one of the largest sites in the entire region, it comprises a modest number of only faint routes. The majority lead southwards or to the northeast. None clearly link Tell Chuera with other settlements, although due to the high site density of the area, several have trajectories that potentially point in the direction thereof.

Hollow Way Network 15

Associated Sites: Site 21 (Tell Ghajar al-Kebir)

Occupation periods of associated sites: EBA, MBA, LBA, Iron Age, Roman/Byzantine, Islamic era

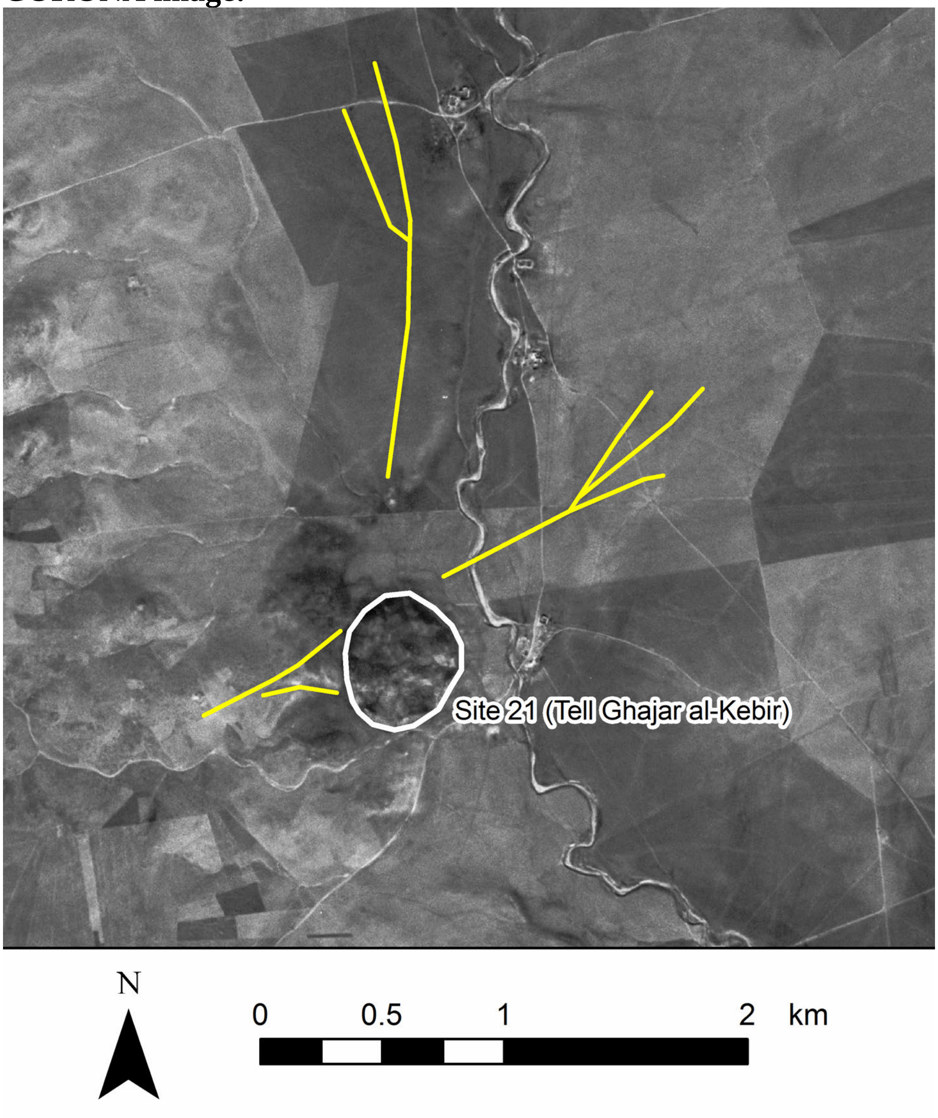
Number of routes emanating from the site(s): 3

Total number of routes (after bifurcations): 7

Number connecting to other sites: 0

Furthest length of terminating routes: 2 km

CORONA image:



Description: The routes emanating from Tell Ghajar al-Kebir lead to the southwest, north, and northeast, respectively, with the latter crossing the adjacent Wadi Dakhliz.

Hollow Way Network 16

Associated Sites: Site 62 (Msherifa)

Occupation periods of associated sites: Halaf, EBA, Iron Age

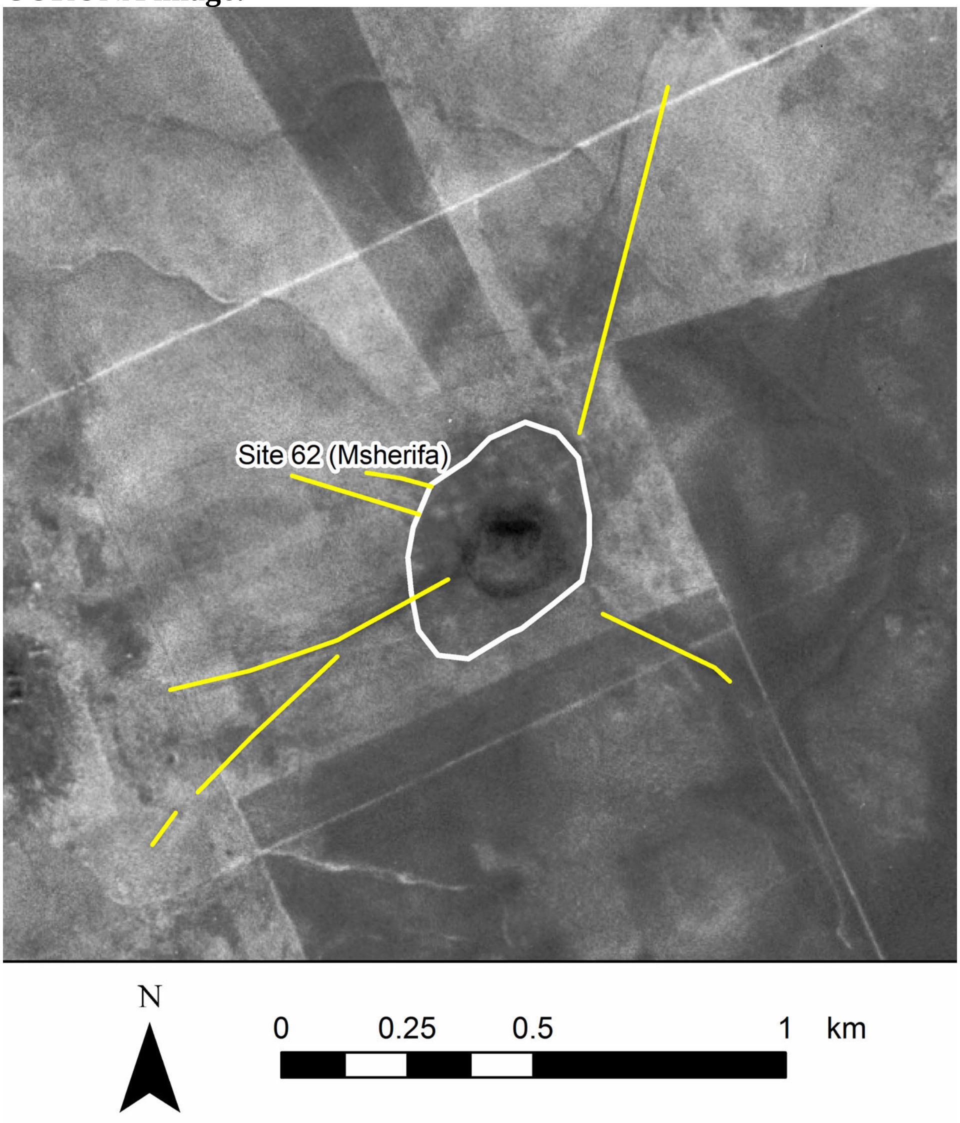
Number of routes emanating from the site(s): 5

Total number of routes (after bifurcations): 7

Number connecting to other sites: 0

Furthest length of terminating routes: 0.7 km

CORONA image:



Description: This network emanates from Msherifa in all directions.

Hollow Way Network 17

Associated Sites: Site 73 (Tell Zaidi)

Occupation periods of associated sites: Halaf, EBA, LBA, Iron Age, Islamic era

Number of routes emanating from the site(s): 2

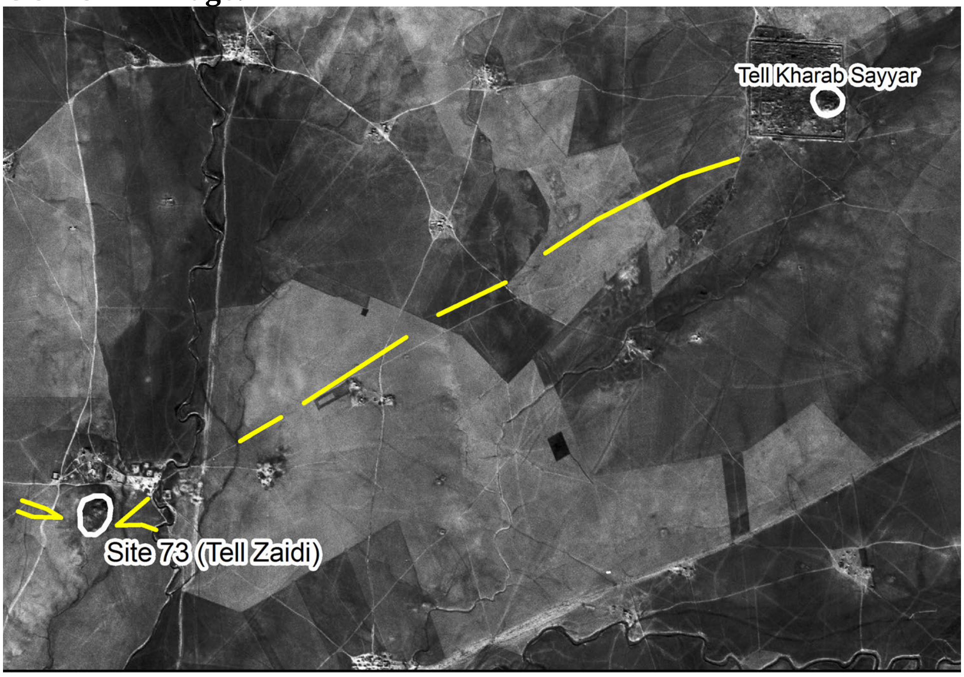
Total number of routes (after bifurcations): 4

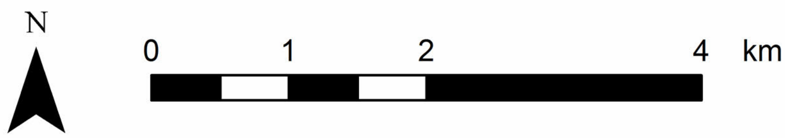
N**umber connecting to other sites:** 1

Furthest length of terminating routes: 0.6 km

Furthest length of site-connecting routes: 6 km

CORONA image:





Description: This hollow way network is clear, but mostly small. One exception is the 6-kilometre route that connects Tell Zaidi with Kharab Sayyar, the only definite site-linking hollow way in the survey area. Its trajectory appears to lead directly to the latter site's tell, however its final 400 metres are obscured by the adjacent Islamic-era settlement.

4.4.5.2. Canals/Qanats

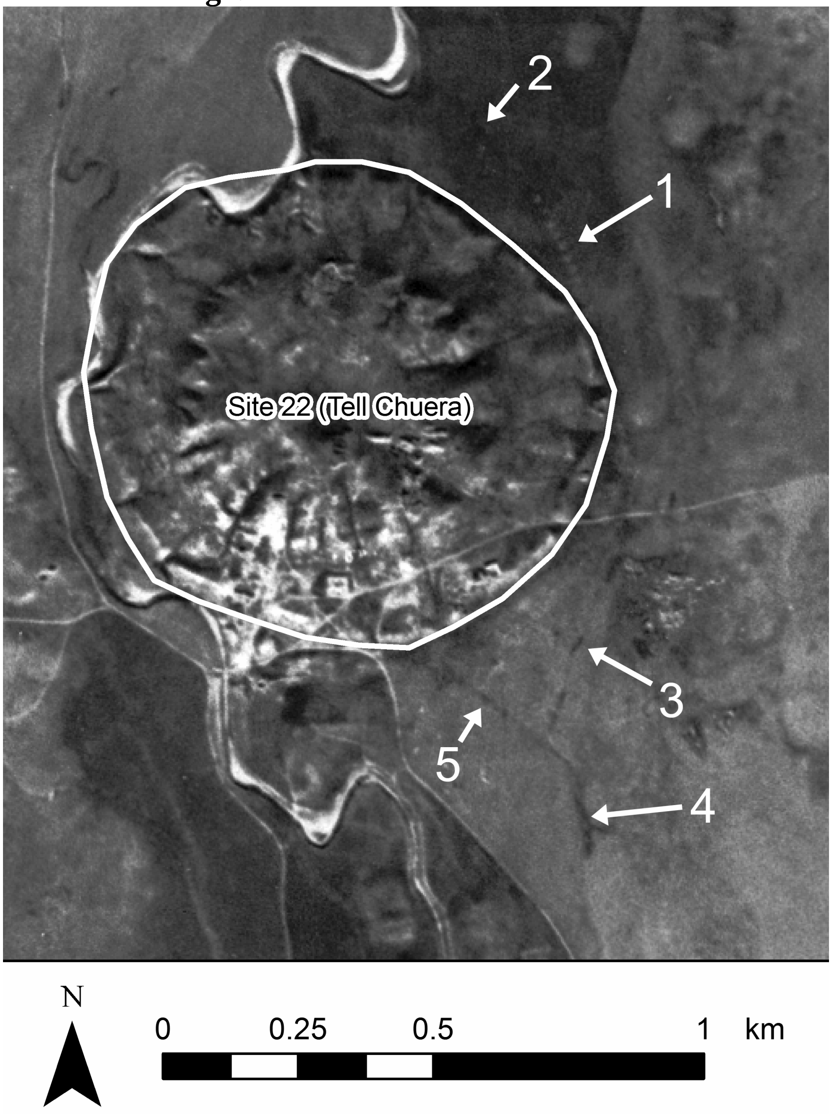
Canal 1/Qanat 2

Associated Sites: Site 22 (Tell Chuera)

Occupation periods of associated sites: Halaf, Ubaid, LC, EBA, LBA

Traceable length: 280 metres of qanat, a further 1270 metres of canal

CORONA image:



Description: This qanat-and-canal system, which passes Tell Chuera at its northeastern side, appears to be the only definite feature of this kind in the survey area. Around 280 metres of its course is clearly visible on CORONA imagery as a series of characteristic small white dots [1]; however, it can be traced a further 320 metres in a northwesterly direction as a faint slightly curved dark line [2], joining the Wadi Chuera ca. 200 metres north of the site. Its route to the south is harder to trace, as it passes so close to the outer edge of Tell Chuera that the feature is lost for some 150 metres. However, a further dark line that appears to match the qanat's trajectory continues on the tell's southeastern side; likely a canal [3]. This feature runs 700 metres to the southwest before joining what appears to be a natural wadi [4]. A further dark line, probably another canal branch [5], leads from the southern edge of Tell Chuera to join the above feature at this confluence. The mentioned wadi in turn joins the Wadi Chuera 2.5 km to the south. Ground investigations around Tell Chuera have determined the existence of several canals in the vicinity, leading to or connecting small wadis, tentatively dated to the TCH ID period (Meyer 2010d: 209-210).

4.4.6. Combined Overview of Survey Area

The distribution of settlements in this area is largely dictated by the courses of branches of the Wadi Hamar, with the vast majority of sites from all periods located either on or in close proximity to these. This is especially true of larger sites over 10 ha, of which 80% lie directly on wadis, and the remainder are never further than 2 km from one. The area's hollow ways, meanwhile, are too sparse to make out any clear distribution, with the only network of any significant size being that around Tell Chuera; the same is true of qanats and canals (see Fig. 4.22).

Section 4.5: Unsurveyed Region

4.5.1. The Archaeological Landscape

The remainder of the GWJ region contains no surveys; thus the data below stems exclusively from the remote sensing I carried out for this thesis. It exhibits an even, but heterogeneous settlement pattern. Though few areas exist that entirely lack settlement, the density of sites is markedly higher in the northern areas of greater precipitation, with quite a significant drop off occurring south of the Wadi Hamar region (Fig. 4.12). This is not a wholly even gradient of density increase, however, as towards the arid south there is some clustering of sites, creating a greater density than the semi-arid latitudinal centre of the region. The largest area with no sites occurs in the centre of the southeastern triangle created by the Euphrates and Khabur rivers; the most arid part of the region.

A very different picture is provided by focussing on large sites of over 10 ha. Around 85% (35 out of 42 sites) are clustered along a narrow band in the very northern section of the area (Fig. 4.12). South of this, there is a significant gap before any other sites of over 10 ha exist. In the south, only six large settlements were identified, and they form a roughly latitudinal band in the southern third of the area.

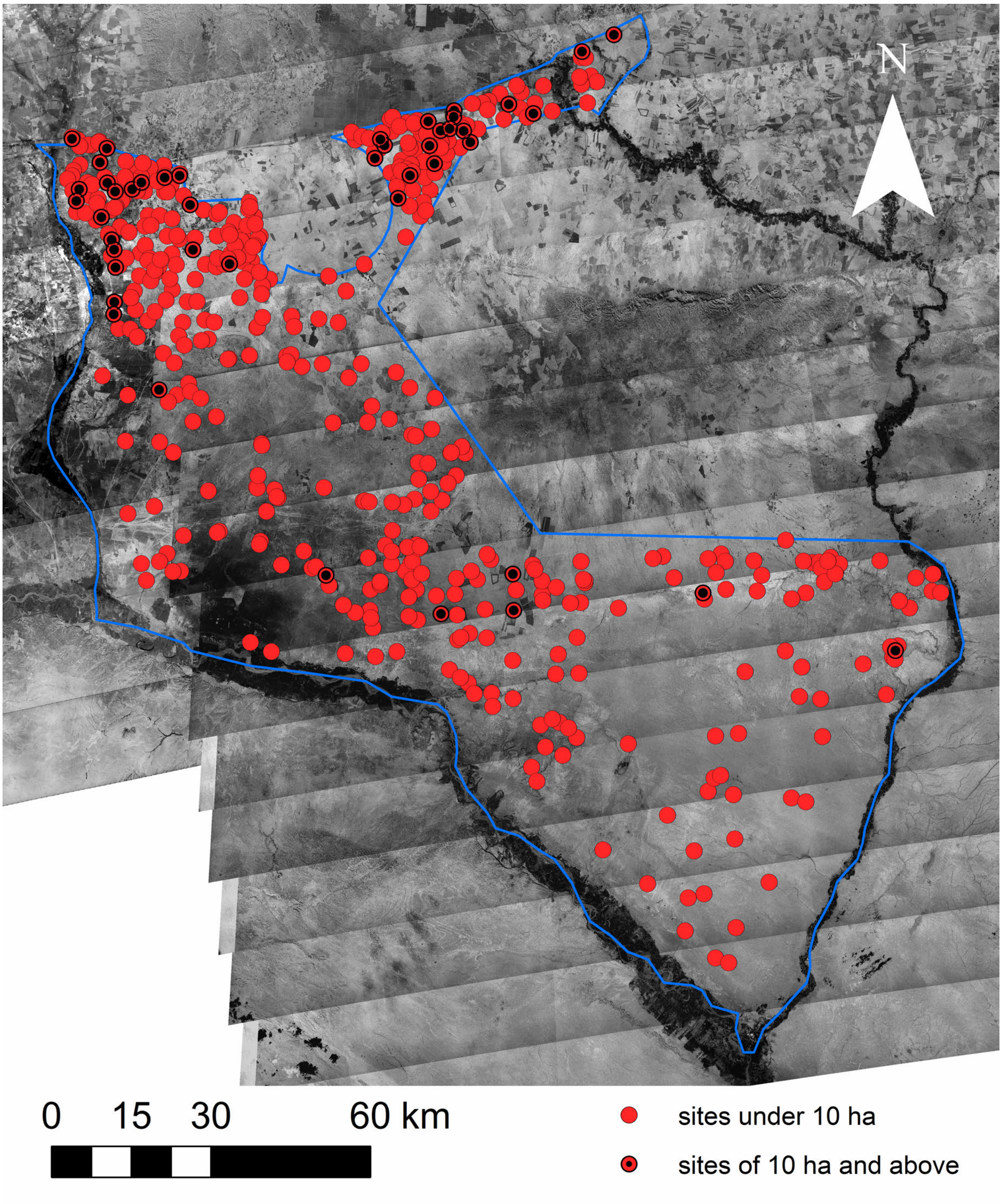


Figure 4.12: CORONA image (Missions 1038-2 [west] and 1105-1 [east]) of the unsurveyed area showing all sites identified by the remote sensing survey.

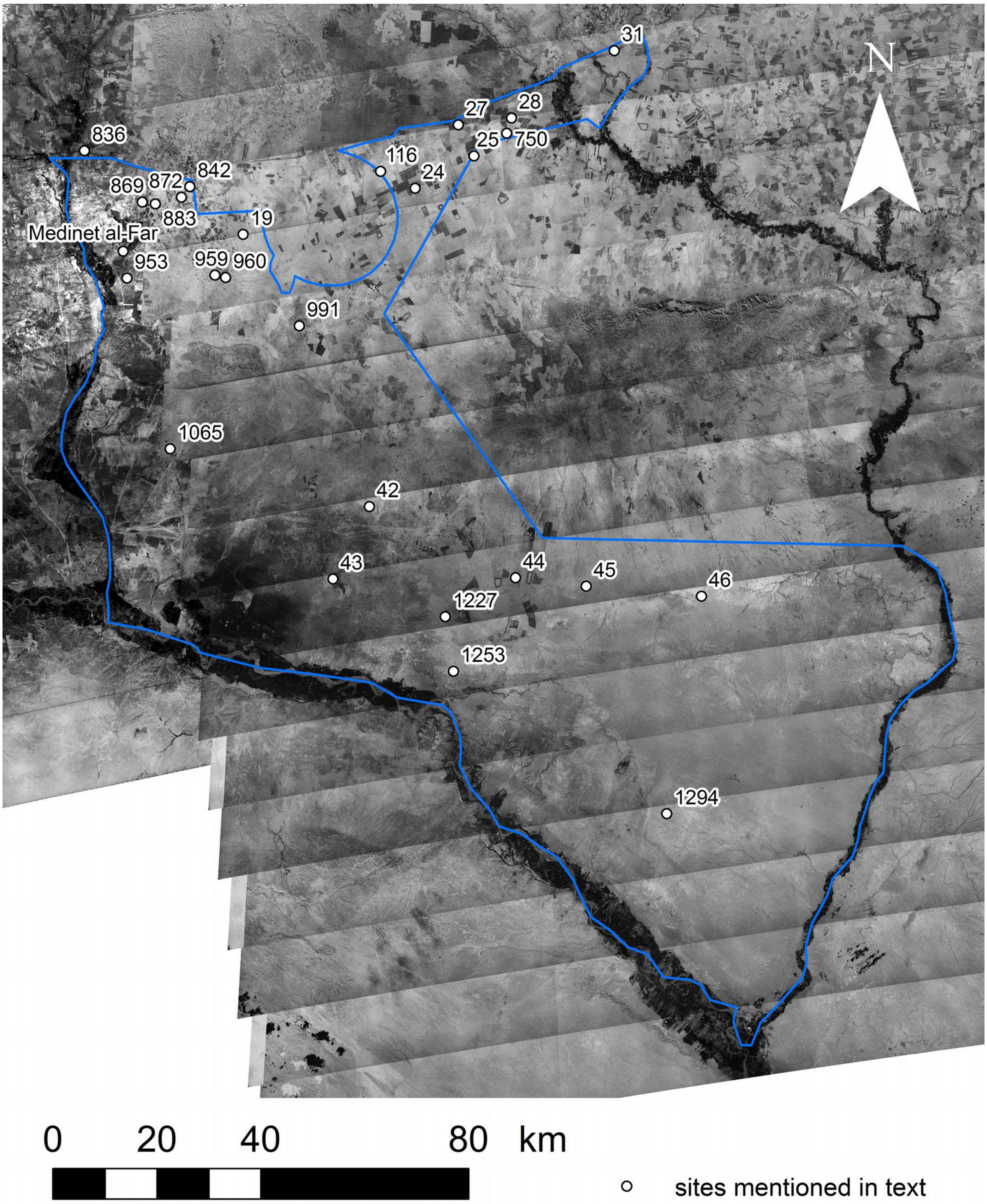


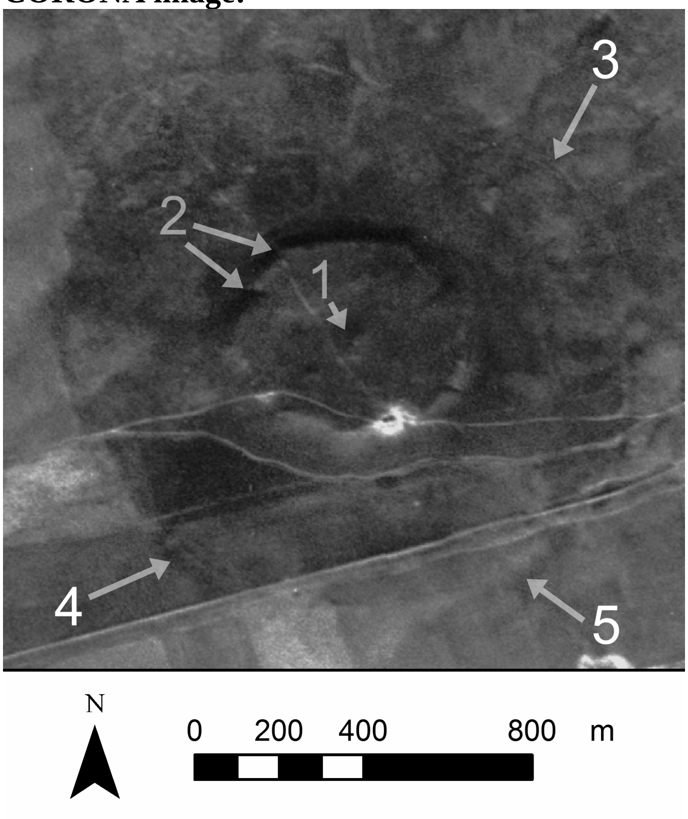
Figure 4.13: CORONA image of the unsurveyed area showing all sites mentioned in text, by this thesis' numbering system.

4.5.2. Tell Sites

4.5.2.1. Two-Tiered Fortified Tells

The unsurveyed regions of the GWJ contain 14 two-tiered fortified tells visible on remote sensing data. Of these, eight are located in a southwest-to-northeast band north of the 270 mm isohyet. In the south, four sites form a latitudinal alignment that roughly follows the 200 mm isohyet. Between these, two further examples were identified. The majority of these central and southern sites are located some distance from the main river valleys, the closest being 20 km from these. In the northeast, however, two-tiered fortified tells also exist in much closer vicinity to branches of the Khabur river. The sites recorded range in size from 1.5 to 141 hectares, and comprise all categories of two-tiered fortified tells. Given the large area of the unsurveyed region, the following descriptions are grouped first by the abovementioned geographical locations and then site type, starting with the northern band.

Site 31 (Tell Chanafes)
Size: 141 ha
Morphology: sub-circular *true Kranzhügel* with a central depression
Visited in the field (reference): yes (von Oppenheim 1943)
Occupation periods: not available
CORONA image:



Description: Tell Chanafes is located slightly beyond the far northeastern corner of the GWJ, some 12 km east of the point where the Khabur crosses the Syro-Turkish border. Though this site is not strictly within the area of research, its extremely large size (over 20 ha above the 120 ha "size ceiling" set by Gil Stein [2004: 65-66; see also Lawrence & Wilkinson 2015: 339]) and two-tiered fortified appearance make its inclusion a necessity. It sits directly on the aforementioned national border, with roughly half of the site located in the no-man's land that separates the two countries. Its circular central truncated mound measures 26 ha on CORONA imagery. Though the overall area on its flat top appears as a large depression, its very centre features a small rise of no more than 1 ha [1]. Some CORONA imagery missions also show evidence for other rises within Tell Chanafes' central mound; in particular its northwestern section appears as a somewhat undulating surface. The site's inner wall features several narrow gaps that indicate gates [2], while its lower town is visible as a distinct darkened region on CORONA imagery, with a clear undulating surface and outer town wall. This last feature is visible across Turkish territory [3], the no-man's land [4], and a small section in Syrian territory [5]. Numerous and extensive hollow ways emanate from the site in all directions, though they are harder to trace to the north.

Ground information on Tell Chanafes is very hard to come by, however it has been mentioned a couple of times in literature, and visited at least once; by von Oppenheim in 1911, who, in publication, mentions it only in passing as a "*[großer] Ruinenhügel*"[77] (von Oppenheim 1943: 15). However, there is evidence that he considered it of greater importance than this brief comment would suggest, as eight photographs were taken of the site[78], which show a large sprawling mound with extensive stone remains on its surface. Some of these appear to be visible on GeoEye imagery, especially two linear features at the southwestern edge of the site's lower town (Fig. 4.14). The site's outer wall, however, is less visible on modern satellite imagery due to extensive agricultural activity, highlighted by rapid deterioration visible on CORONA between January 1967 and November 1968.

[77] "[large ancient mound]"

[78] Not available for reproduction here, but freely accessible online at the Arachne image database of the Deutsches Archäologisches Institut; at http://arachne.uni-koeln.de tagged as "Tell Hanafis".

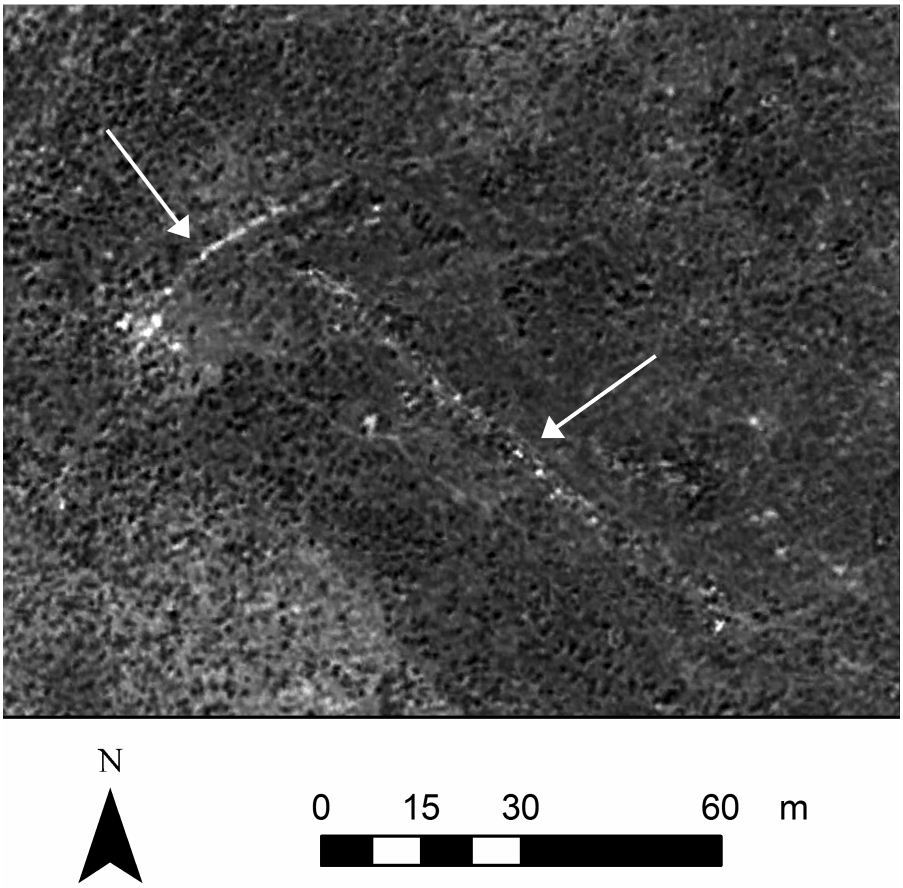


Figure 4.14: GeoEye imagery with the two linear features visible within the lower town of Tell Chanafes indicated.

Site 27 (Tell Khanzir)

Size: 40 ha

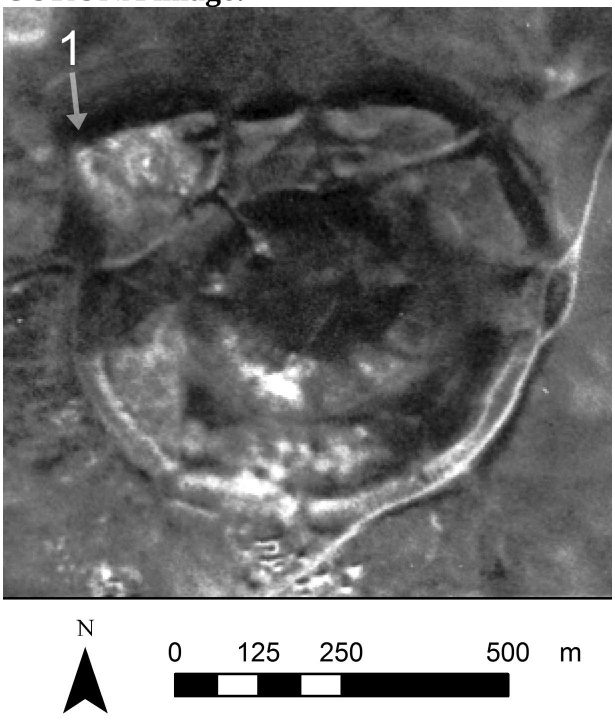
Morphology: circular/polygonal *true Kranzhügel* with a central depression

Visited in the field (reference): yes (Kühne & Schneider 1988; von Oppenheim in Moortgat-Correns 1972)

Occupation periods: at least EBA

EBA occupation phases: at least EJZ 3b-5

CORONA image:



Description: Tell Khanzir is located 500 metres south of the Syro-Turkish border, on the sloping edge of what appears to be a former terrace of the westernmost branch of the Khabur, now nearly 8 km away. The inner wall around the site's circular upper town of 8 ha is confirmed by von Oppenheim's observations (Moortgat-Correns 1972: 29). Von Oppenheim goes on to describe the existence of several narrow cuts in this wall, emanating radially outwards from the mound's centre; these are also visible on CORONA. The centre of this mound shows up as a depression on satellite imagery, as stated by Meyer and Orthmann (2013: 148-149). Tell Khanzir's outer wall, while mostly following the course of its inner wall at a constant distance, features what appears to be a protruding rectangular outcrop which contains a nearly 90-degree angle [1]. This wall is also incised by many gaps visible on CORONA, several of which clearly align with those of the inner wall, suggesting city gates and a possible radial road system like that of Tell Chuera. Extensive hollow ways emanate from Tell Khanzir in all directions but the south.

Site 24 (Tell Abu Shakhat)

Size: 30 ha

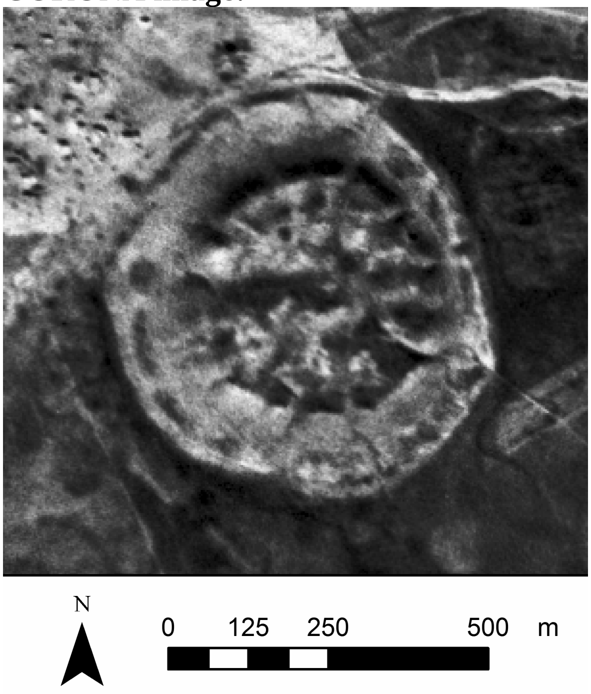
Morphology: rounded pentagonal *true Kranzhügel* with a central depression

Visited in the field (reference): yes (Kühne & Schneider 1988; von Oppenheim in Moortgat-Correns 1972)

Occupation periods: at least EBA

EBA occupation phases: at least EJZ 2-3b

CORONA image:



Description: Tell Abu Shakhat lies 12 km south of the Turkish border and is a clear representative example of the *true Kranzhügel* category. The site lies 2.5 km north of a major branch of the Wadi Hamar, and adjacent to several small branches. It was described as a "*mächtiger, verhältnismäßig niedriger 'Kranzhügel'*"[79] by von Oppenheim (Moortgat-Correns 1972: 28), though it appears topographically prominent on remote sensing. The upper town of this tell is a flat circular mound, the centre of which features a clear depression on satellite imagery that encompasses its entirety, as stated by Meyer and Orthmann (2013: 148-149) as well as von Oppenheim (Moortgat-Correns 1972: 28). A large number of radial gulleys in the inner wall indicate several gates, probably further hollowed-out by weathering. Tell Abu Shakhat's outer wall features many gaps indicating city gates; though none as clear as those of the inner wall. Several of these appear to line up with inner wall gaps, indicating a possible radial road system. Von Oppenheim further noted a particularly prominent ditch running east-west across the entirety of the site, which he interpreted as its main axis (*ibidem*). Though

[79] "[large, relatively low 'Kranzhügel']"

this is not clearly visible by remote sensing, some of the CORONA imagery missions do suggest such a feature, which also has an analogy at Tell Chuera (Meyer 2010d: 204). Several hollow ways emanate from the tell towards the north; though the absence of southern routes may be due to their invisibility in the undulating landscape of that area.

Site 25 (Tell Bogha)

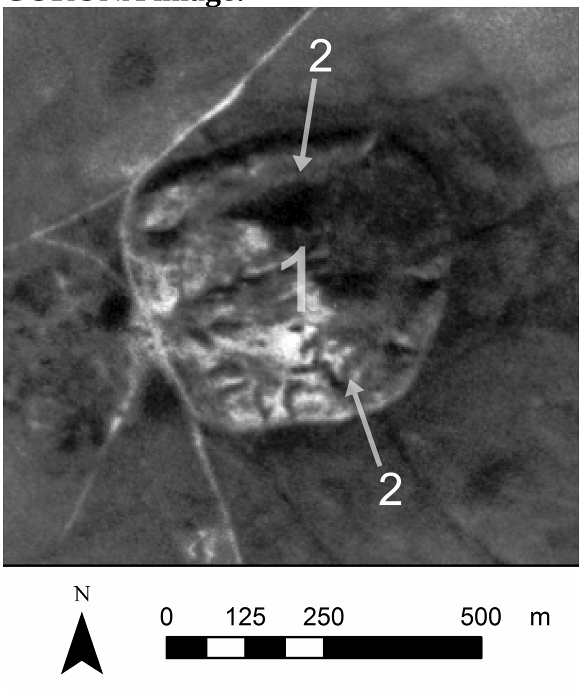
Size: 22 ha

Morphology: rounded pentagonal *true Kranzhügel* with no central depression

Visited in the field (reference): yes (von Oppenheim in Moortgat-Correns 1972)

Occupation periods: not available

CORONA image:



Description: Tell Bogha is located 1.4 km east of a major branch of the Wadi Hamar, and bears the greatest resemblance to Tell Barabra east (Section 4.2.2.1). The site's circular upper town [1] appears on satellite imagery to be mounded in the centre, with no overall depression, as also noted by Meyer and Orthmann (2013: 148-149). Despite this, a clear linear ditch runs southwest to northeast across it, similar to the main axis of Tell Abu Shakhat, but more prominent on remote sensing. The lower town [2] does not follow the shape of the upper town, appearing as a rough pentagon with rounded edges, particularly in the northeast, as also noted by van Liere and Lauffray (1955: 139). The site's outer wall features characteristic gaps indicating city gates. One of these, on the southwestern side, appears to line up with the linear depression across the central mound; and though an equivalent gate on the northeastern side is not apparent, the visibility of that part of the site is lower overall on CORONA. A large number of far-reaching hollow ways emanate from Tell Bogha, several of which were identified by van Liere and Lauffray (1955: Fig. I). These are most prominent to the southwest and northeast, further supporting the idea of a main axis along this bearing.

Site 19

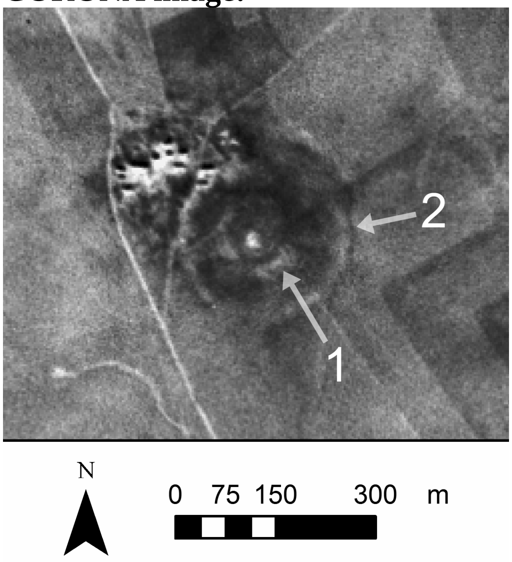
Size: 5.2 ha

Morphology: circular *ringwall settlement* with no central depression

Visited in the field: no

Occupation periods: not available

CORONA image:



Description: Site 19 lies in the northwest of the Western Jazira, some 35 km west of the above discussed settlements, and is the only representation of a *ringwall settlement* in the northern part of the unsurveyed region. Located adjacent to several minor branches of the Wadi Hamar, but 5.5 km from the nearest major branch, this settlement is an unusual example of the site type, resembling in its diminutive size most closely Site 408 in the *Westjazira* Survey region (Section 4.2.2.1). However, its morphology as viewed on CORONA imagery does not appear identical. The circular mounded centre of Site 19 measures 1.2 ha, and is surrounded by an inner wall [1] which, contrary to many *ringwall settlements* (including Site 408), is fairly clearly visible on satellite imagery. Beyond this, a characteristically featureless gap culminates in a very clear outer wall which is almost perfectly circular [2], and is further encircled by a faint ditch. The northwestern portion of this feature is partially covered by an adjacent modern village, while a wadi follows the circular course of its eastern side; both indications of a pre-modern origin for the site.

Site 991

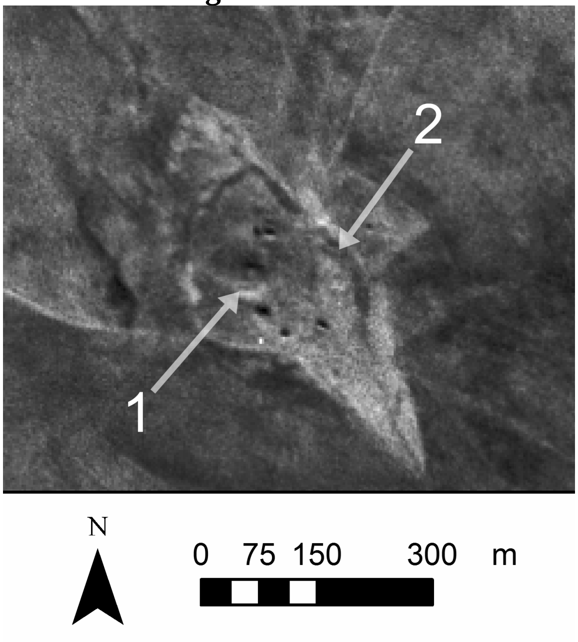
Size: 4.3 ha

Morphology: rounded triangular *Matin-variety* tell

Visited in the field: no

Occupation periods: not available

CORONA image:



Description: Site 991 is located 12 km from the Wadi Hamar, however a mere 500 metres from the nearest tributary wadi. Though small, it exhibits all the hallmarks of a *Matin-variety* tell on multiple satellite imagesets. Its central mound [1] is circular, conical, and offset to the southwest, while beyond the undulating surface of the lower town its outer wall [2] is shaped like a very rounded triangle. Some potential hollow ways emanate from this site; however they are very faint on CORONA.

Site 959

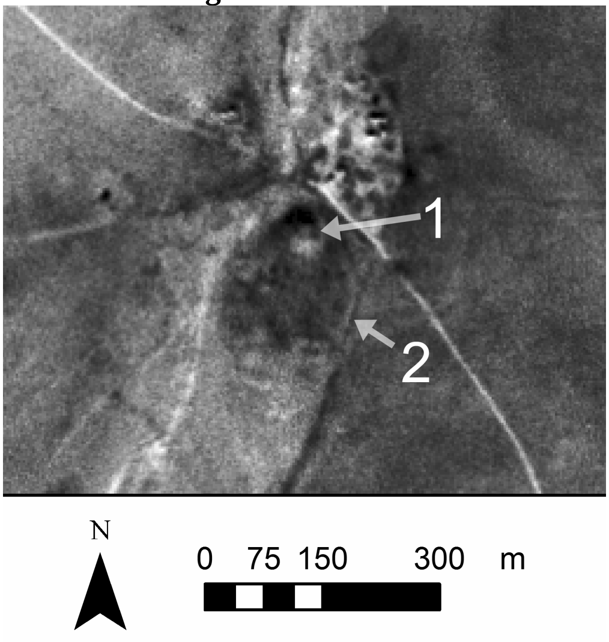
Size: 5.2 ha

Morphology: elliptically-rounded hexagonal *Matin-variety* tell

Visited in the field: no

Occupation periods: not available

CORONA image:



Description: Site 959 is located less than 2 km north of the Wadi Hamar, and lies directly on a minor tributary. It is well represented on satellite imagery, featuring a circular conical mound [1] located at the northern extremity of its lower town and a partially clear outer wall [2]. Several hollow ways emanate from Site 959, while one particularly prominent routeway appears to pass directly through the site in an east-west trajectory. Several further hollow ways connect this settlement to the circular Site 960, 2 km east-southeast.

Site 116 (Tell Glai'a)

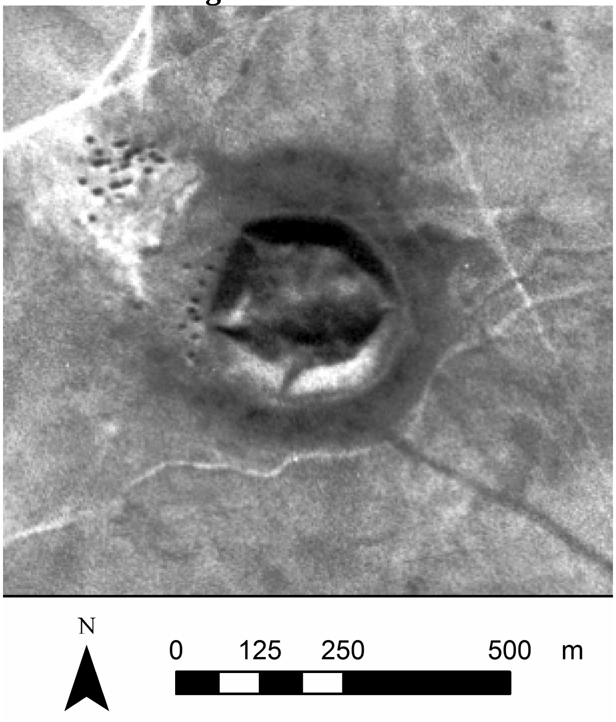
Size: 18 ha

Morphology: circular *Dakhliz-variety* tell with no central depression

Visited in the field: no

Occupation periods: not available

CORONA image:



Description: Tell Glai'a is located directly on the northeastern edge of the Wadi Hamar Survey area, but was not recorded on the ground. Situated 6 km south of the Turkish border, this settlement is adjacent to two minor tributaries and 2.6 km east of a major tributary of the Wadi Hamar. Its appearance is very similar to that of Tell Dakhliz, however flipped on its east-west axis. The central mound is a circular truncated cone, the central area of which features a large depression, especially prominent on its eastern side. Its inner wall features four prominent gaps indicating gates. Some of these, especially the one to the west, appear as a somewhat weathered-out gulley. Beyond this, a dark undulating surface, clearly visible on satellite imagery, forms a roughly circular "halo" of human activity that makes up the remainder of the settlement's area.

Site 42

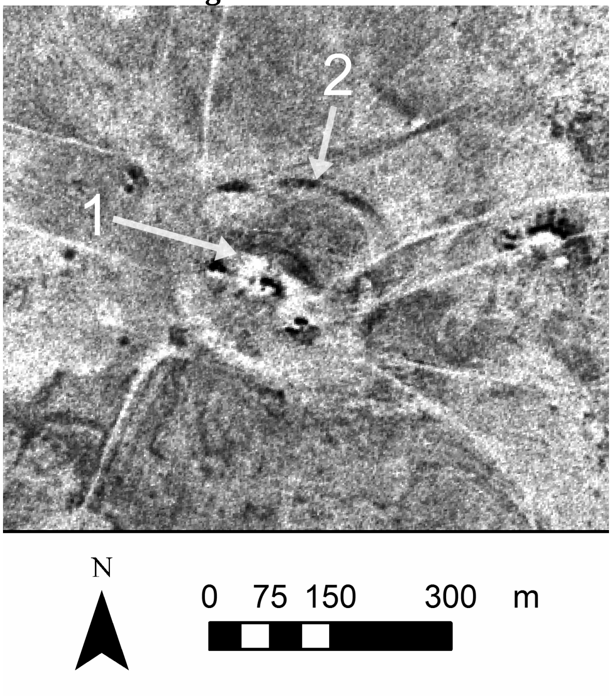
Size: 6.1 ha, possibly up to 20 ha

Morphology: rounded square *ringwall settlement* with no central depression

Visited in the field: no

Occupation periods: not available

CORONA image:



Description: Site 42 is located some 50 km east of the Balikh, adjacent to a minor seasonal wadi. The settlement exhibits a morphology that categorises it as a definite *ringwall settlement*, however its shape is not a common one. Its inner mound is a starkly elongated peaked mound [1], roughly centrally located, and its clear outer wall [2] features several gaps, some of them very large. It is unclear how many of these indicate city gates, and how many are due to the degradation of certain parts of the feature due to modern roads, five of which converge on the site. The overall shape encompassed by this wall is almost square, with rounded edges particularly to the west. The area north of the settlement (away from the wadi on which it is situated) is marked by a slightly undulating surface of a darker shade than the surrounding landscape on CORONA imagery, indicating potential human activity for up to 20 ha adjacent to the site.

Site 1065 (Tell Jerwa)

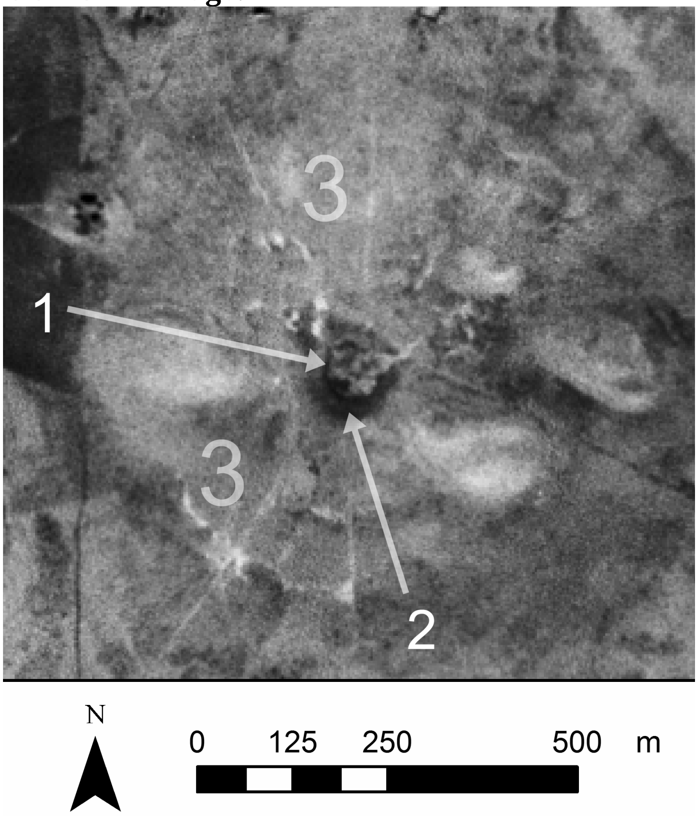
Size: 1.3 ha, possibly up to 35 ha

Morphology: small two-tiered fortified site

Visited in the field (reference): yes (von Oppenheim in Moortgat-Correns 1992)

Occupation periods: not available

CORONA image:



Description: Just under 20 km east of the Balikh river valley, this tell is an unusual small site that finds a close analogy in the even smaller Site 445 (Section 4.2.2.1). Tell Jerwa is situated on a wadi that drains into the Euphrates. Based on the amount of agriculture that this appeared to sustain in times of pre-mechanised farming, as viewed on old satellite imagery, it provides a more constant water source than other seasonal wadis in the area. It was visited by von Oppenheim in 1913, however practically no information is available on any observations made, beyond the fact that he described it amongst "*besonders bemerkenswerte Ruinen*"[80] (Moortgat-Correns 1992: 18). The central part of Tell Jerwa is a flat-topped, steep-sided 0.4-hectare mound in the shape of an irregular circle. This is surrounded by a clear inner wall [1], beyond which the concentric lower part of the site extends for between 25 and 35 metres outwards, forming a further irregular circle clearly visible as a dark patch [2]. A wall around this, if it existed, is barely detectable on remote sensing. Around the entire site is a very

[80] "[particularly notable ruins]"

strongly undulating landscape [3] that includes individual elliptical mounds of up to 2 ha within it. The total area encompassed by this is at least 35 ha. Straight paths emanate outwards from Tell Jerwa, crossing the centre like spokes of a wheel. These appear to be modern, but are so linear and regular that they suggest a basis on older features.

The remaining four two-tiered fortified tell sites in the region are located significantly further south than any of the above, and form a linear alignment in an east-southeast to west-northwest direction: the "Malhat line" (discussed further in Sections 5.3.3-4). These are listed below from east to west.

Site 46 (Khirbet Malhat)

Size: 33 ha

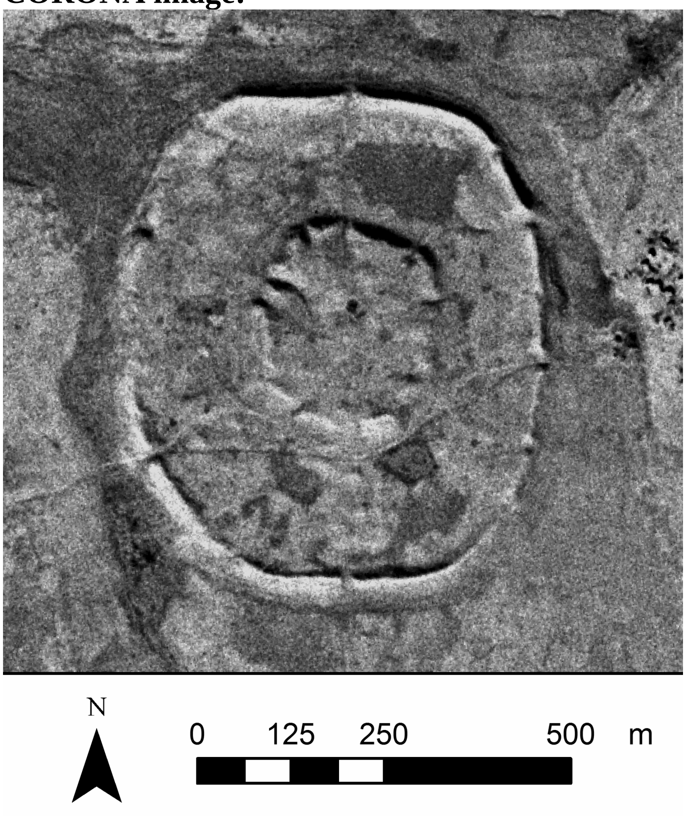
Morphology: rounded hexagonal *ringwall settlement* with a central depression

Visited in the field (reference): yes (Kühne 1983; Kühne & Schneider 1988; Quenet & Sultan 2014; von Oppenheim in Moortgat-Correns 1972)

Occupation periods: EBA, probably Iron Age

EBA occupation phases: EJZ 1-3b

CORONA image:



Description: Khirbet Malhat is located some 50 km northeast of the Euphrates and 45 km west of the Khabur, receiving only 200 mm of annual precipitation and at the very edge of the area watered by runoff from the Jebel Abd al-Aziz (Kouchoukos 1998: 346-349). However, as well as being situated on an east-west running seasonal wadi, the groundwater table in this area is high enough to be reachable by hand-dug wells (*ibidem*: 387), two of which were documented by Musil (1927: 87-88) in close vicinity to the site. It is the largest site along the “Malhat line”, and the only one to have been extensively documented on the ground (see Sections 2.1.4.2, 2.1.4.8). Khirbet Malhat’s central mound appears as a 6-hectare “rounded square” (Quenet & Sultan 2014: 122); flat on top with a slight depression. Though invisible on remote sensing, this site features an inner wall, noted by both von Oppenheim (Moortgat-Correns 1972: 34) and the Khirbet Malhat Survey (Quenet & Sultan 2014: 121-122), who further stated that only on geophysical survey did it appear definite. This survey further showed the existence of a radial and concentric street network in the lower town. The outer wall features at least ten gaps indicative of city gates, very clear on CORONA imagery, which appear to be situated according to compass directions.

Site 45

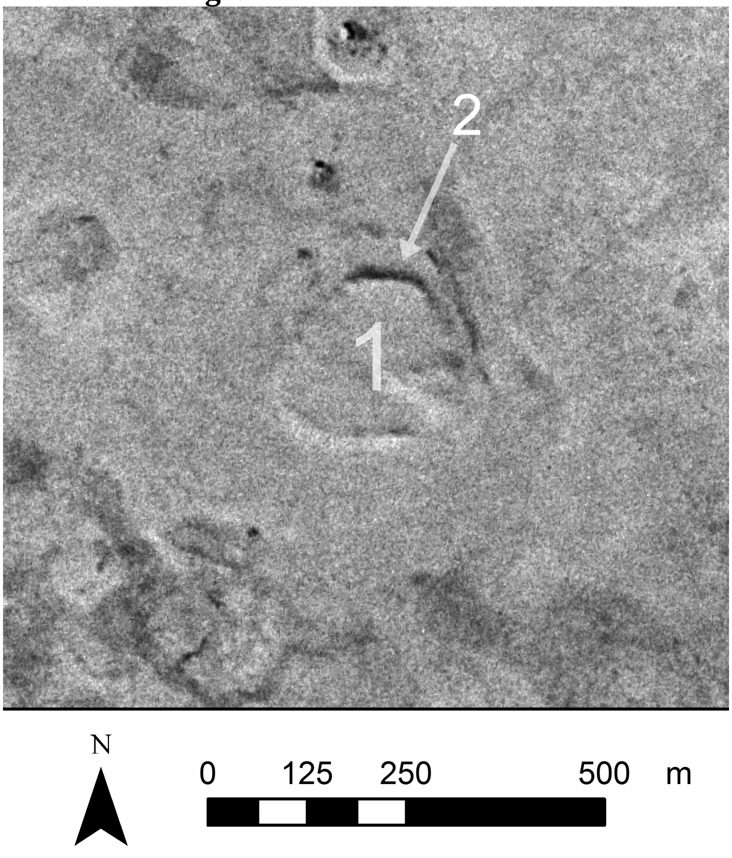
Size: 8.6 ha

Morphology: rounded triangular two-tiered fortified tell with a central depression

Visited in the field: no

Occupation periods: not available

CORONA image:



Description: Site 45 lies 22 km west-northwest of Khirbet Malhat, and is situated along the same boundary of high groundwater table served by runoff from the Jebel Abd al-Aziz (Kouchoukos 1998: 387). Furthermore, it is located on the same seasonal wadi as that site, directly south of a 1.2-kilometre long narrow strip that is heavily cultivated on CORONA imagery from 1967, indicating the presence of an aquifer close to the surface. Site 45 comprises a central 4.7-hectare mound [1] (with a strong DEM signature) of an unusual rounded triangular shape enclosed by a clear wall, especially prominent along its northern edge. Surrounding this, the site extends further in the form of a narrow circular band [2]. The outer edge of this is demarcated by a dark encircling line on CORONA imagery that may indicate an extremely eroded wall. This is far from clear, however, and thus Site 45 is categorised as an “other” two-tiered fortified tell.

Site 44 (Tell Zahamak)

Size: 5 ha, possibly larger (Quenet & Sultan 2014); 10 ha, possibly up to 50 ha (measured on CORONA)

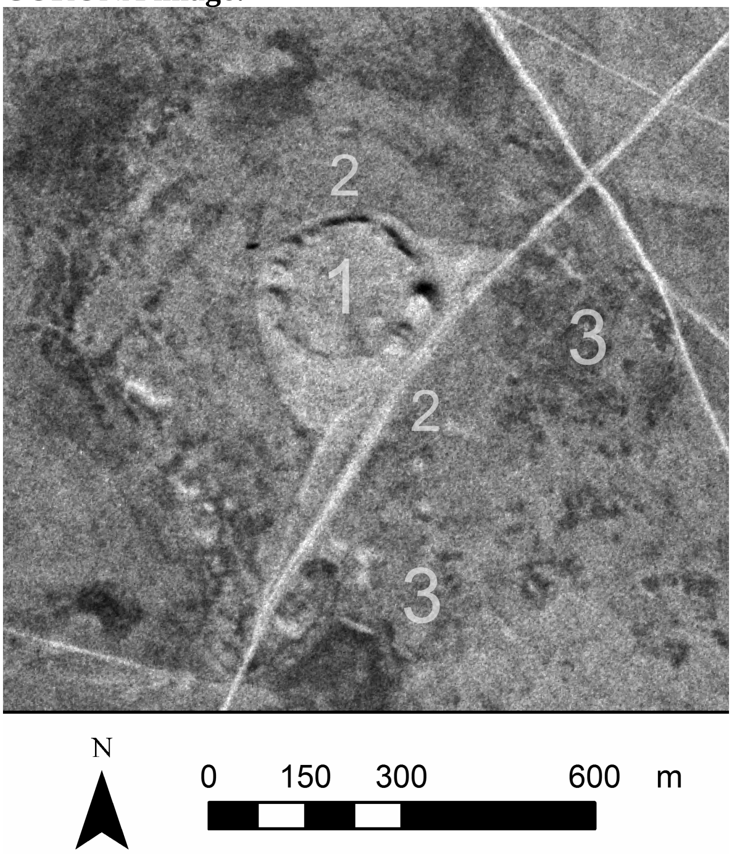
Morphology: elliptical two-tiered fortified tell with a possible central depression

Visited in the field (reference): yes (Quenet & Sultan 2014)

Occupation periods: at least EBA

EBA occupation phases: not available

CORONA image:



Description: Tell Zahamak is situated 14 km west-northwest of Site 45, and is the westernmost fortified tell to be located in the area of high groundwater table as defined by Kouchoukos (1998: 387). It appears as “Tell Ezhamak” in Moortgat-Correns (1972: Karte II); however marked at a location that is in fact some 15 km south-southwest of the site. Tell Zahamak is situated 1 km north of the same wadi that passes the two sites described above. Furthermore, it appears to be located a mere 400 metres east of a smaller tributary of that wadi. Musil (1927: 89) mentions the 20-metre deep well of “Bir az-Zhamak” in the vicinity of the tell, though he did not visit the site. Tell Zahamak comprises a circular flat 5.5-hectare inner mound [1], the inside of which appears almost entirely level, though with a possible slight depression in the very centre. This area is also devoid of any structural remains on remote sensing data. It is, however, surrounded by a very clear wall that features several prominent gaps, particularly on its eastern and western side (two gaps apiece). These are however too irregularly placed and shaped to be called city gates (and not due to weathering) with any certainty. The landscape immediately surrounding Tell Zahamak appears somewhat undulating and of a clearly lighter shade [2]; an elliptical area measuring 10 ha. These parts of the site closely resemble a *Dakhliz-variety* tell, however it is further encircled by an elliptical band of a distinctly darker, mottled shade [3], which on the western side abuts the wadi tributary mentioned above. The entire area covered by the tell and this surrounding region is some 50 ha. Overall, this site differs sufficiently from the morphology of a *Dakhliz-variety* tell to be regarded as unique.

Site 43 (Tell Sha'ir [Jazira])

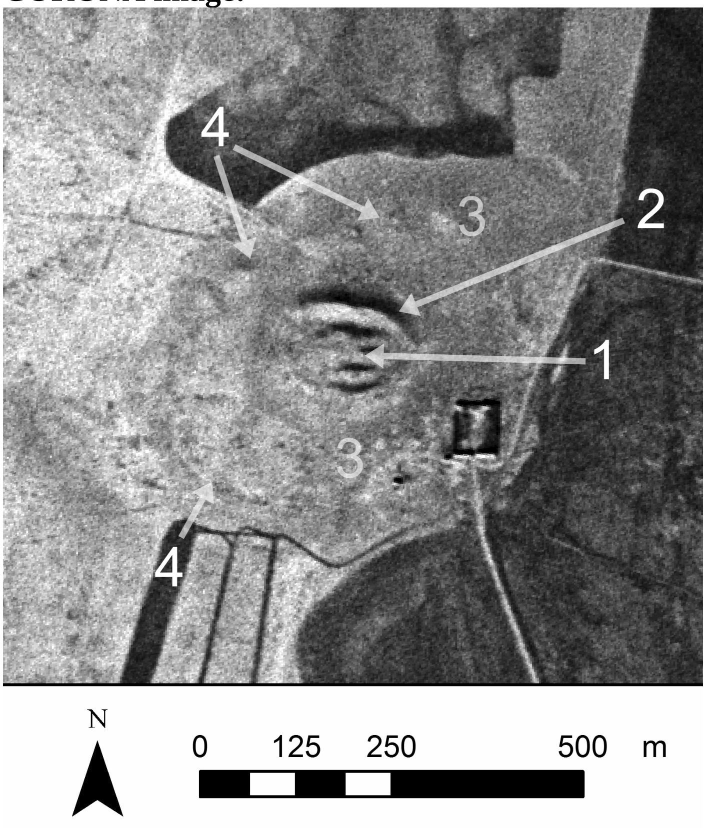
Size: 21 ha

Morphology: irregular triangular two-tiered fortified tell with no central depression

Visited in the field (reference): yes (Bell 1911)

Occupation periods: not available

CORONA image:



Description: Tell Sha'ir [Jazira] is located 35 km west-northwest of Tell Zahamak, and under 20 km north of the Euphrates. The site is situated directly on a wadi of presumably seasonal nature, though a 1000-hectare area of agriculture to its southeast, visible on CORONA imagery from January 1967, indicates that it may carry more frequent and constant water than other wadis in the region. According to Kouchoukos (1998: 387), this area is a gypsum sink, where “accessible […] aquifers and the accumulation of arable soils make limited cultivation possible”. Tell Sha’ir has a very unusual morphology. A central elliptical mound of no more than 1 ha [1] is deeply incised by two east-west gulleys. Around this, a gap of around 20 metres separates the mound from a surrounding wall [2], equally elliptical, that appears to feature large gaps at its eastern and western end. At 2.2 hectares, this entire part of the site resembles an elongated very small *ringwall settlement*. However, Tell Sha’ir extends further beyond its wall in an extremely irregular triangular shape, measuring a total of 21 ha. This area appears as an extremely undulating surface [3]. Within this part of the site, a horseshoe-shaped feature that resembles an extremely eroded outer wall exists [4]. It is very intermittent, with apparent gaps of ca. 30 metres every 50 metres or so. Furthermore, this potential wall does not follow the outline of the site’s undulating area, which extends beyond these ramparts to the south, west, and north. These unique features make it difficult to correlate Tell Sha’ir with any other settlement in the GWJ.

4.5.2.2. Other Tells

Other tell settlements in the area are relatively evenly distributed, but do not appear at all south of the 190 mm isohyet. A total of 54 probable ordinary tells cover the region as far south as 80 km north of the confluence between the Khabur and the Euphrates. Despite a generally even presence across the landscape, some slight clustering of tells exists, particularly in the vicinity of the rivers. These settlements vary from 0.1 to 8.9 ha, making their size distribution lower than those in the three surveyed regions described above. Few appear to have been documented in the past, and thus their toponyms are unknown for all but one site.

Site 28 (Tell Kharab ‘Arnan)

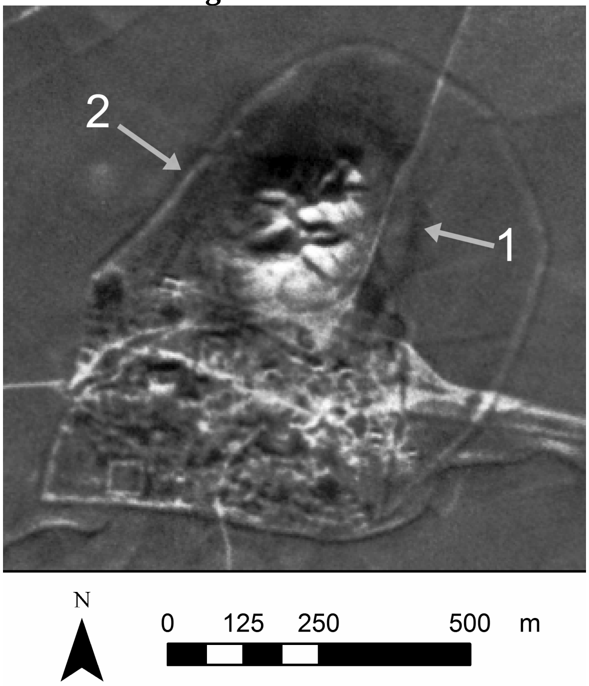
Size: 8.9 ha

Morphology: elliptical conical tell

Visited in the field (reference): yes (Cauvin 1970)

Occupation periods: at least Halaf

CORONA image:



Description: Tell Kharab ‘Arnan is located 4 km southeast of the Turkish border in the northeastern area of the Western Jazira, and roughly equidistant between Tell Khanzir and the Khabur. It is situated adjacent to a fairly major wadi that flows eastwards into the Khabur, and thus is not part of the Wadi Hamar system. The medium-sized tell features a slightly elliptical mound, scarred across its entire surface by a large number of deep weathering gulleys. These appear more incised on CORONA imagery than is the norm of tells across the region. Thus it is hard to determine whether the tell was mounded, flat-topped, or featured a central depression, though the evidence seems to indicate the former. A dark line appears to encircle the tell at a distance of 40 to 70 metres [1]; however it is obscured to the south and west by the more recent structures of the Kharab ‘Arnan flat settlement. This feature could possibly indicate a fortification structure; however it is very unclear, and due to the proximity of the later site could easily be of more recent date. Therefore Tell Kharab ‘Arnan has not been classified as a two-tiered fortified tell, though further investigation could well identify it as one. Another very clear circular/polygonal wall [2] encloses the entire site including the flat settlement, but almost certainly dates to the later settlement’s construction. Hollow ways emanate from the tell in all directions, most prominently to the south.

Site 836

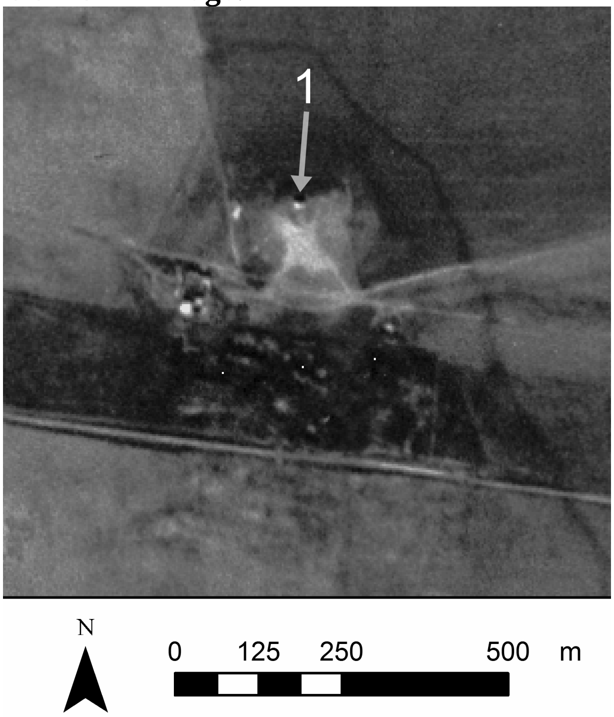
Size: 4.8 ha

Morphology: circular/polygonal conical tell

Visited in the field: no

Occupation periods: not available

CORONA image:



Description: This medium-sized tell is located directly on the Turkish-Syrian border and a mere 3 km east of the Balikh. It is furthermore situated 1.1 km from a major tributary of that river, and adjacent to a minor tributary. The site appears as an irregular conical mound, circular to the south and west but straight-sided to the north and east. The top of the feature rises to a fairly narrow peak, on top of which an additional small mound or structure of no more than 20 metres diameter is visible [1]; based on GeoEye imagery likely a modern border watchtower. Several hollow ways extend outwards from Site 836, primarily to the north; although a prominent one runs southwest.

4.5.2.3. Combined Overview of Tell Sites

The distribution of tell settlements in the unsurveyed region of the Western Jazira is remarkably even, with only two exceptions (see Fig. 4.21). One is the southern triangle of minimal rainfall between the Euphrates and Khabur; no tells appear to exist south of the 190 mm isohyet. The other is the Jebel Abd al-Aziz and Tual ‘Abah uplands. Examining sites of above 10 ha alone eliminates ordinary tells, which are all smaller in size. Eight two-tiered fortified sites make up these larger tells, representing just under 60% of the site type. Geographically, these are divided into two distinct groups; five are located in the far northeast of the Western Jazira, while a further three are evenly distributed (at 35 km intervals) far to the south; on or just above the 200 mm isohyet along the “Malhat line” described above. The remaining two-tiered fortified tells, smaller than 10 ha, are distributed across the entire western half of the Western Jazira north of this line.

The ordinary tells in this region, meanwhile, are mostly of the conical variety. Many of these, particularly those in the northern area, are attached to flat settlements that most likely saw later occupation than the tells, though they may additionally have been contemporaneous. One variant example of this is Tell Kharab ‘Arnan, which, as well as being the largest ordinary tell by a margin of 50%, is so scarred by gulleys that its original morphology is almost entirely obscured.

4.5.3. Flat Settlements

A large number of sites located in the unsurveyed portion of the Western Jazira are flat settlements, with some 200 (three times the number of tell sites) identified (see Fig. 4.21). By far the majority of these are located in the north, with around 70% above the 250 mm rainfall isohyet, no more than 30 km south of the Turkish border. The remainder of flat settlements are fairly evenly distributed; albeit with a reduction of density below the 180 mm isohyet, as well as a lack of sites in the Jebel Abd al-Aziz and Tual ‘Abah areas. Around half of these sites are 1 ha or smaller in size, while the largest reach over 100 ha. The largest of all, and the best investigated, is the 111-hectare Islamic era settlement of Medinet al-Far, located on the Wadi Hamar and around 4 km east of the Balikh valley (see de Jong 2012; Haase 1996).

All these sites have the characteristic morphology of Late Antiquity or Islamic era settlements, with strongly undulating surfaces on CORONA imagery, and often containing one or two single large structures of around 100 by 100 metres. Five flat settlements, measuring between 6 and 23 ha, are situated adjacent to small-to-medium-sized tells of between 1 and 9 ha. These are all located in the far north of the region, no more than 7 km south of the Turkish border. Around 100 flat settlements in the unsurveyed region have an area of 1 ha or less; 60% of these comprise a single building each, while the remainder show up as a handful of small square structures ca. 30 by 30 metres in size.

4.5.4. Other Sites

A number of additional sites, either devoid of clear morphology or too heavily obscured to properly identify, are located in the unsurveyed portion of the Western Jazira. The majority of these are confined to the arid and almost completely unexplored southeastern triangle formed by the Euphrates and Khabur in the 70 km north of their confluence. One of the most common features in this area appears as an agglomeration of very small dark-shaded circles, most likely mounds of no more than 15 metres in diameter. They are visible both on CORONA imagery and modern GeoEye images, indicating a permanence that makes longevity possible. The largest such grouping is Site 1227, located 16 km north of the Euphrates and roughly equidistant between the Balikh and Khabur, which covers an area of around 20 ha (Fig. 4.15). However, at least a hundred such conglomerations exist, ranging from such a size down to single mounds. These also appear in areas further north (especially northwest, in the Tual ‘Abah region), but there are more obscured and unclear. These are potentially Bronze Age burial mounds, as on GeoEye images they bear a close resemblance to those identified by ground survey on the Jebel Bishri south of the Middle Euphrates (see Fig. 1.1; see Fujii & Adachi 2010).

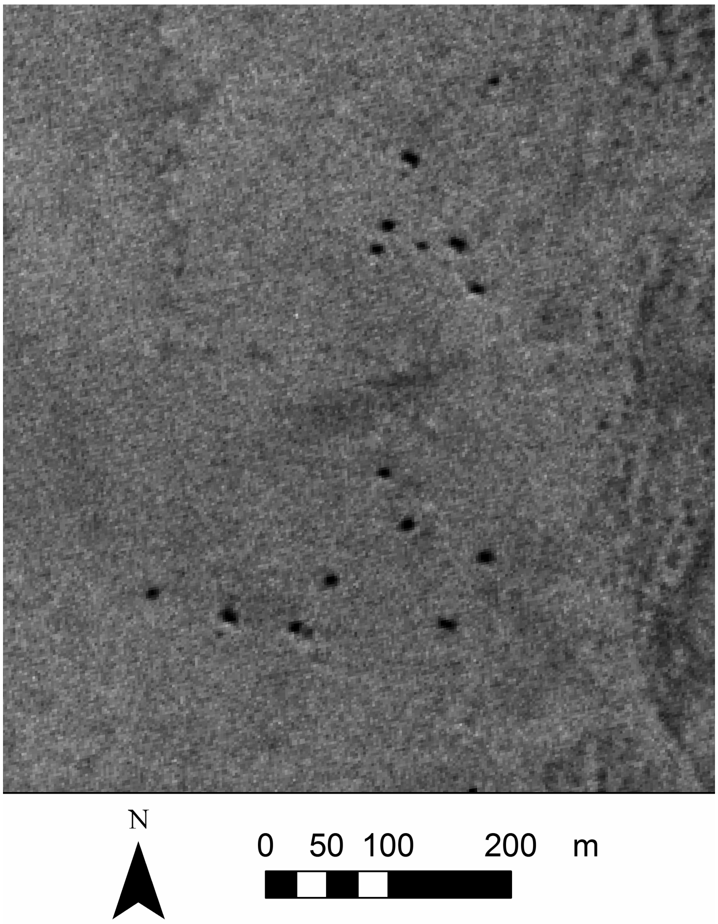


Figure 4.15: CORONA satellite image of Site 1227, a typical example of the dark-shaded circles visible on remote sensing in the southern portion of the unsurveyed area.

Another indefinable site type is represented by a number of very small circular features, mostly situated in the vicinity of medium-sized to large wadis (Fig. 4.16). These measure no more than 40 metres in diameter. Their centre is marked by a darker circular patch. They are clearly visible both on CORONA and modern GeoEye imagery, on which some additionally appear to be surrounded by faint enclosures. What these features represent is unknown, and they could well be modern open water-storage facilities siphoning seasonal flow from wadis. However, an ancient origin cannot be discounted either, especially as some appear vaguely mounded on GeoEye images.

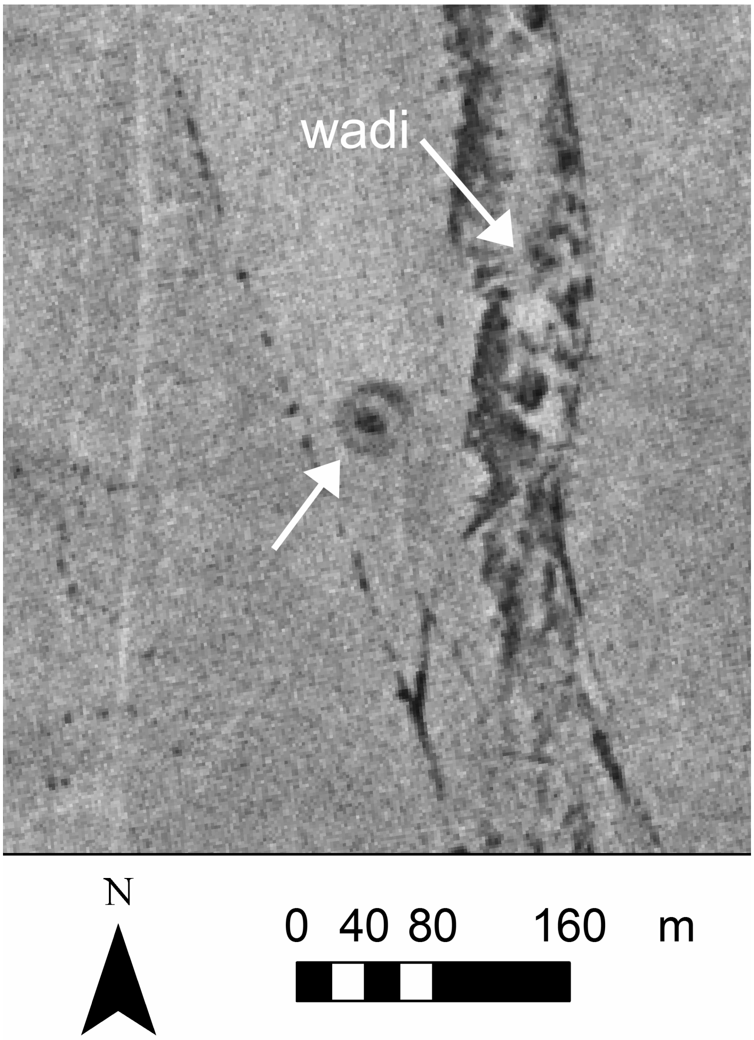


Figure 4.16: CORONA satellite image of a typical example (Site 1294) of the very small circular features found mainly in the southern portion of the unsurveyed area.

A third site type in this region appears as a cluster of small rounded polygonal enclosures, which vaguely resemble buildings but are situated adjacently together. A prime example of this feature is the 1-hectare Site 1282, located 18 km northeast of the Euphrates and 55 km west of the Khabur, which comprises at least 10 adjoining enclosures in an elongated cluster (Fig. 4.17). The central areas of these enclosures are devoid of any features. All are situated in the southeastern triangle of the Western Jazira, and in fairly close proximity to major rivers, being no further than 20 km from either the Euphrates or the Khabur. They strongly resemble structures found at Jawa and Khirbet Abu al-Husayn in the Jordanian Badia, interpreted there as dwellings and animal holding enclosures (Müller-Neuhof 2014a).

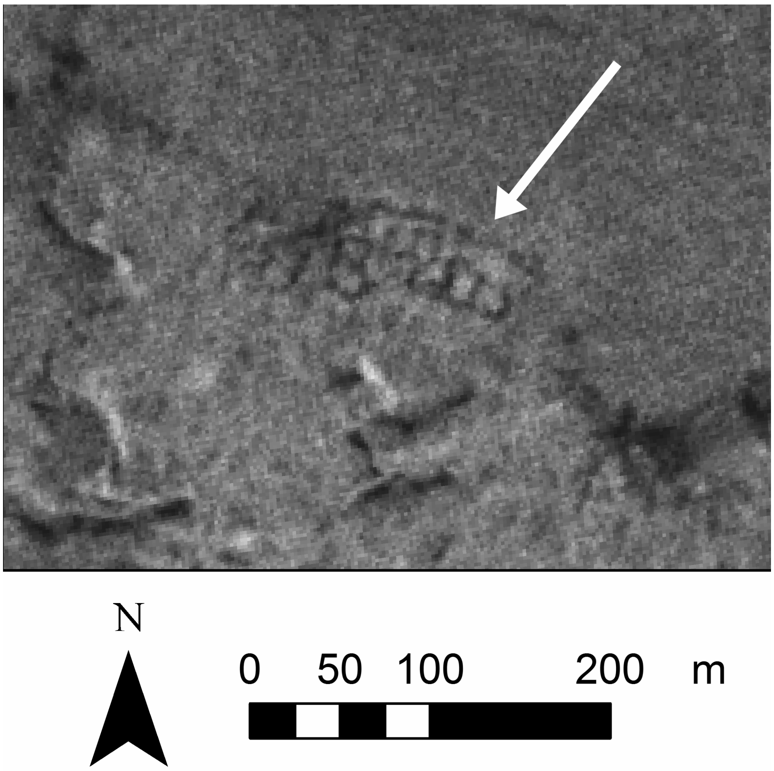


Figure 4.17: CORONA satellite image of Site 1282, a typical example of the clusters of sub-circular enclosures that are visible in the southeastern unsurveyed area.

One site type of very clear morphology, but unknown origin, is the so-called "desert kite", which exists in great number in the southeastern portion of the Western Jazira. A study carried out by Quenet and Chambrade (2013: 61-62) using remote sensing data identified a total of 27 such features, most within the vicinity of the Khabur. One typical example is located 11 km west of the Khabur, some 37 km east-southeast of Khirbet Malhat, in the vicinity of the edge of the steppe plateau before it drops off towards the Khabur valley. It comprises an irregular open circle around 300 metres in diameter [1] (Fig. 4.18). The opening points almost directly east. Two short flanges of no more than 50 metres point inwards from the edges of the opening [2]. Extending outwards are two long straight wall-like features (often called "tails") [3] that emanate at almost 90 degrees to each other. Both can be traced for around 900 metres on CORONA imagery, the northern one abutting the edge of the abovementioned terrace at its endpoint [4]. The surmised purpose of such desert kites is to trap wild animals, which would have been naturally guided into the circular pen by the "tails" (Bar-Oz *et al.* 2011). Dating these features is extremely difficult, with Quenet and Chambrade (2013: 64-65) tentatively placing them in the EBA by pure virtue of this having been a period of much human activity in the Western Jazira. Further circumstantial evidence for such a date can be derived from the high percentage of gazelle remains in the late 4th/early 3rd millennium BC levels of Tell Chuera (Tab. 2.2), which would have required some method of trapping such as kites. However, these features could equally date from any period from the Pre-Pottery Neolithic to the LBA (Kennedy 2011).

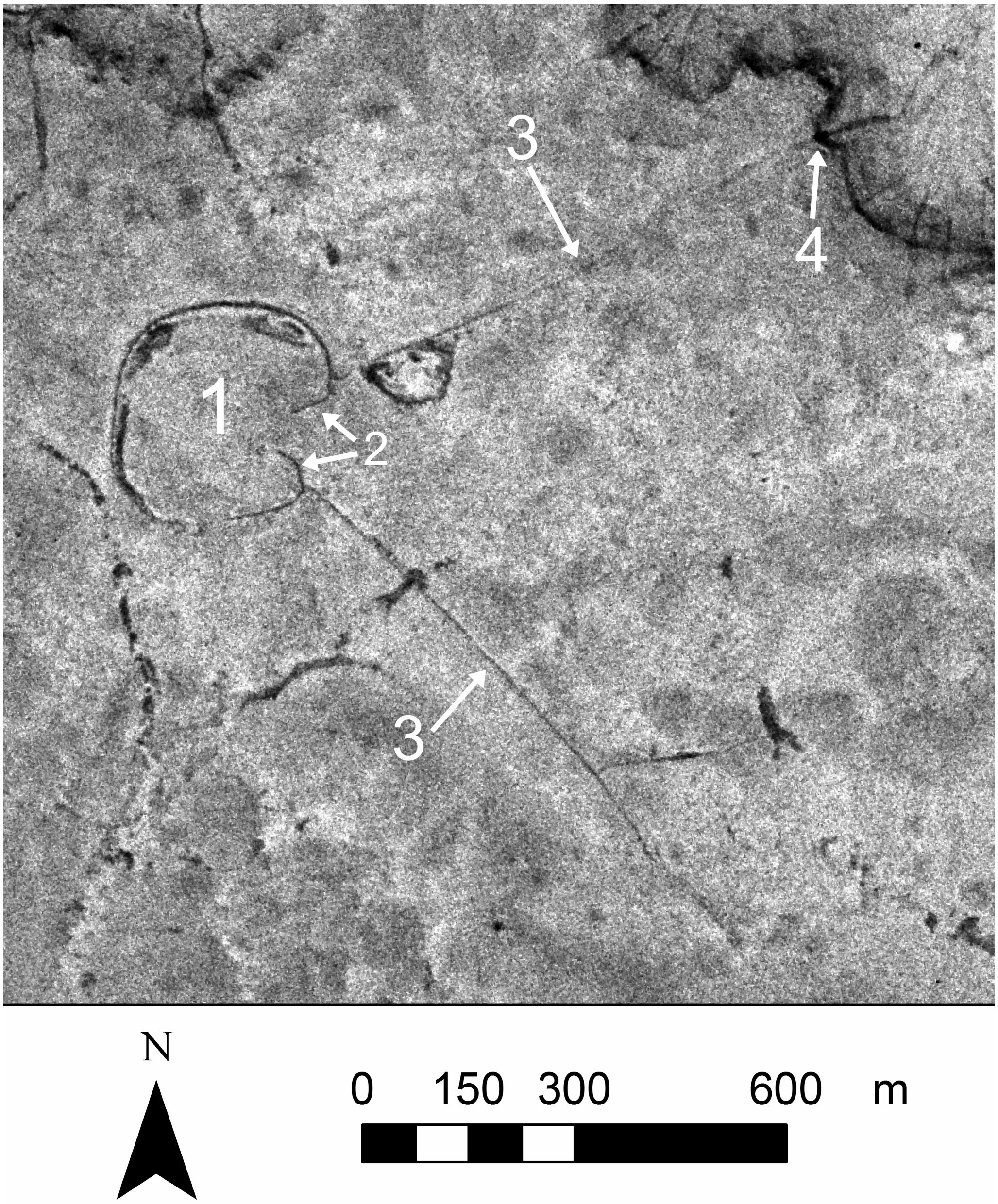


Figure 4.18: CORONA satellite image of a typical "desert kite" in the southeastern section of the unsurveyed area.

The final identified features of unclear morphology are no more than oval patches of dark shading visible on CORONA imagery, all located in the southeastern part of the Western Jazira. These range from around 5 ha to under 1 ha in area, and appear as a uniformly-shaded shape, though a few contain possible small mounds or undulating surface (Fig. 4.19). Their appearance on multiple CORONA missions, as well as occasionally on modern satellite imagery, precludes the possibility of them resulting from cloud cover or other atmospheric conditions. These could be locations of human activity but not permanent occupation, such as sherd scatters resulting from temporary camps or farms.

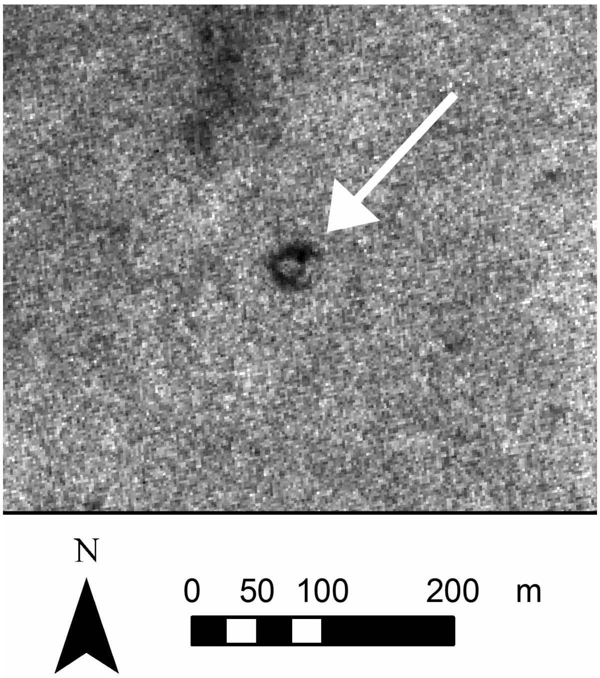


Figure 4.19: CORONA satellite image of a typical elliptical dark-shaded patch of steppe landscape appearing in the southeastern portion of the unsurveyed region.

4.5.5. Inter-site Features

4.5.5.1. Hollow Ways

All hollow ways identified in the unsurveyed area of the Western Jazira are located in its northern quarter, with the majority in the far northeast (see Fig. 4.22). This area is also that of the denser network, approaching in complexity the area immediately north of the Jebel Abd al-Aziz (see Section 4.3.5.1); whereas such routeways' distributions further west are more sparse.

Hollow Way Network 18

Associated Sites: Site 31 (Tell Chanafes)

Occupation periods of associated sites: not available

Number of routes emanating from the site(s): 13

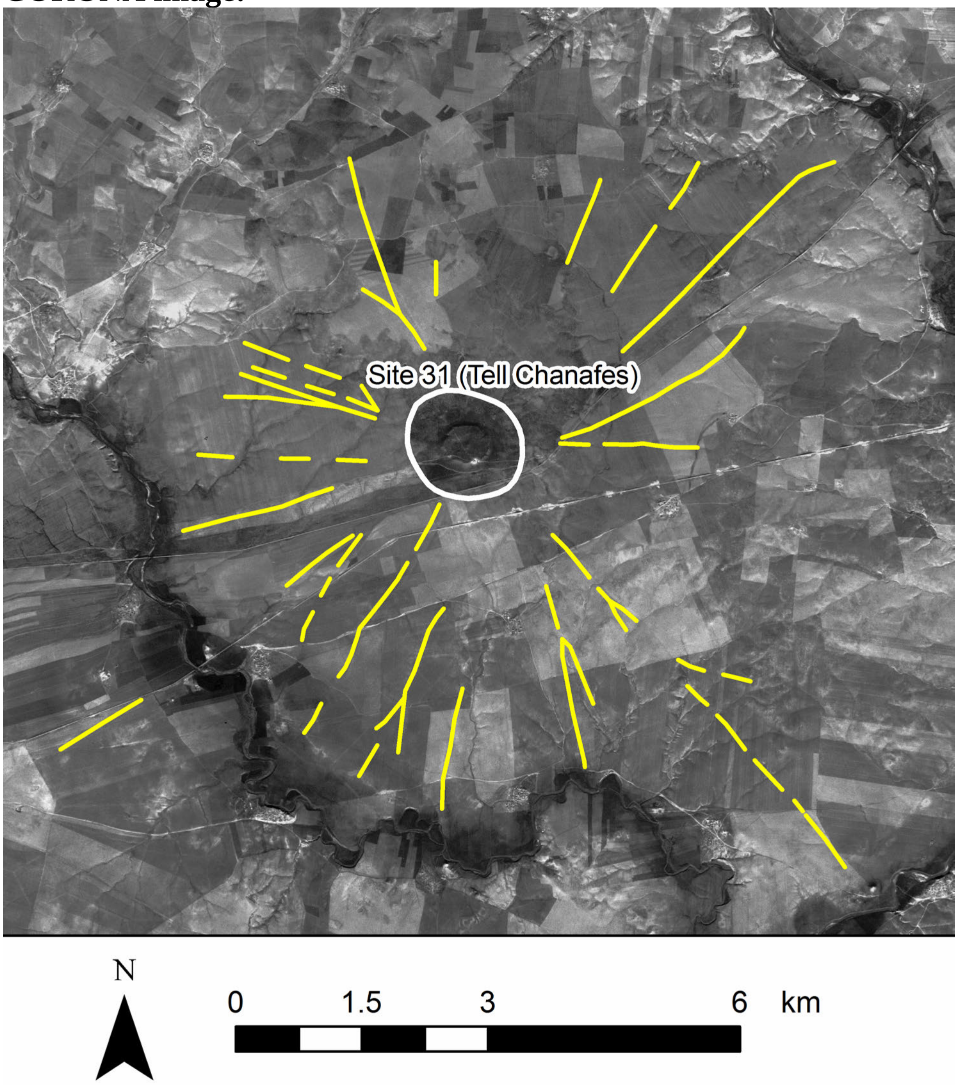
Total number of routes (after bifurcations): 24

Number connecting to other sites: at least 1

Furthest length of terminating routes: 5 km

Furthest length of site-connecting routes: 8.7 km

CORONA image:



Description: By far the most extensive network emanates from the large 141-hectare Tell Chanafes, a fact previously noted by Ur (2010a: 141), who states that it has a "developed system". One route, running south, definitely connects Tell Chanafes to another settlement: the small conical tell Site 721. All others appear to peter out, though the density of settlements in this area of the Khabur river basin mean several of these have the potential to lead to other sites.

Hollow Way Network 19

Associated Sites: Site 25 (Tell Bogha)

Occupation periods of associated sites: not available

Number of routes emanating from the site(s): 9

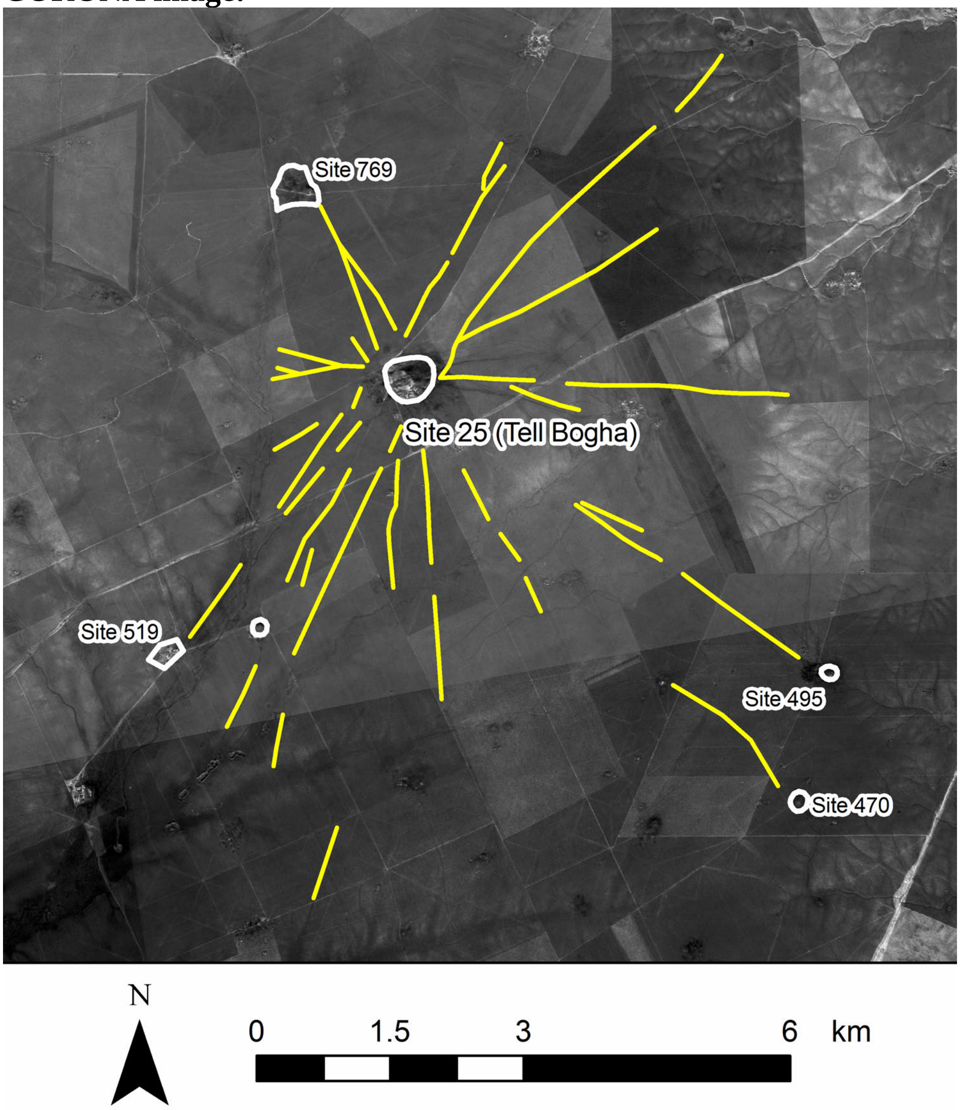
Total number of routes (after bifurcations): 23

Number connecting to other sites: 4 or 5

Furthest length of terminating routes: 5 km

Furthest length of site-connecting routes: up to 6 km

CORONA image:



Description: The next densest hollow way network in the Western Jazira is that emanating from Tell Bogha. At least four of these link Tell Bogha with other settlements.

Hollow Way Network 20

Associated Sites: Site 27 (Tell Khanzir)

Occupation periods of associated sites: at least the EBA

Number of routes emanating from the site(s): 6

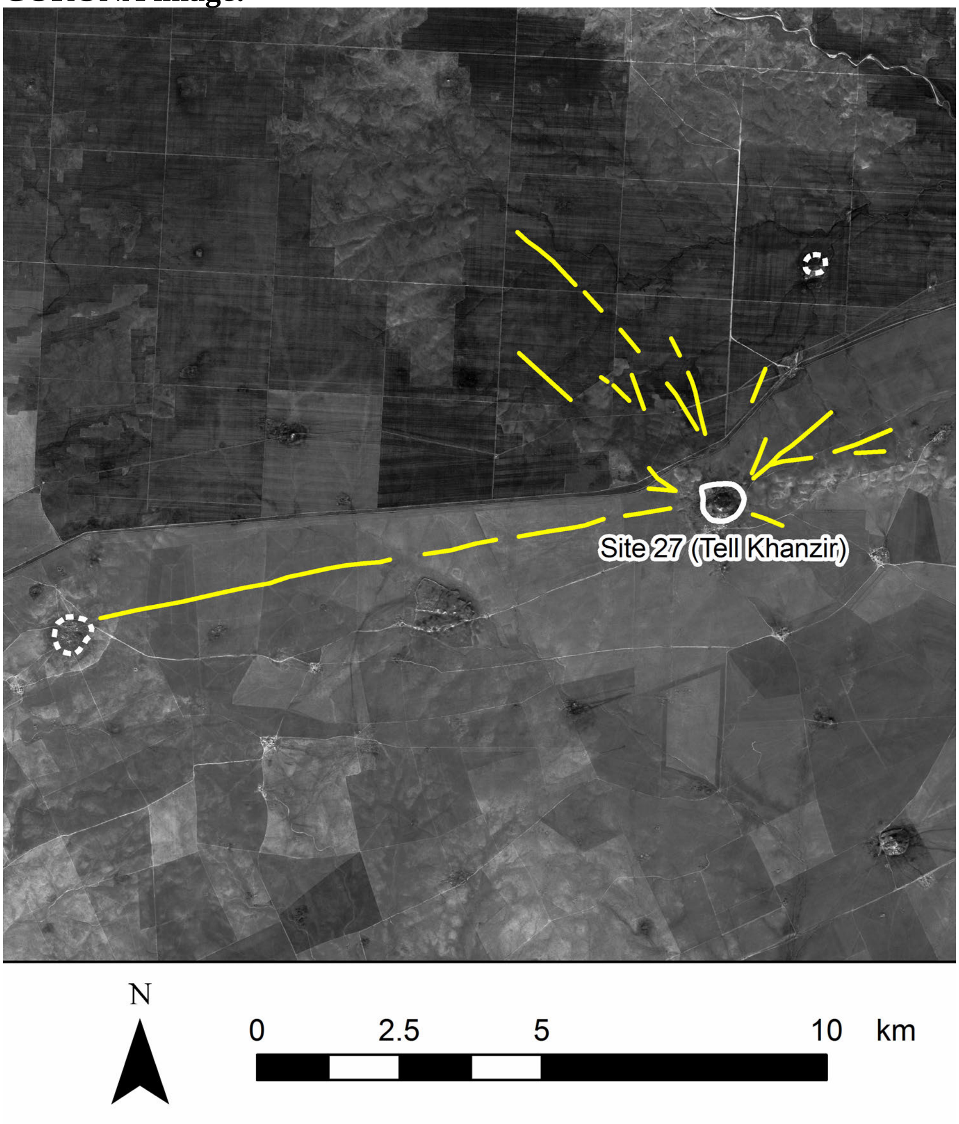
Total number of routes (after bifurcations): 14

Number connecting to other sites: 1 or 2

Furthest length of terminating routes: 5.5 km

Furthest length of site-connecting routes: 11 km

CORONA image:



Description: One of the routes in the network emanating from Tell Khanzir runs north-northeast in the direction of a nearby tell (outside the remote sensing survey area), while another runs west to connect to a tentative site 11 km away.

Hollow Way Network 21

Associated Sites: Site 28 (Tell Kharab ‘Arnan)

Occupation periods of associated sites: at least Halaf

Number of routes emanating from the site(s): 11

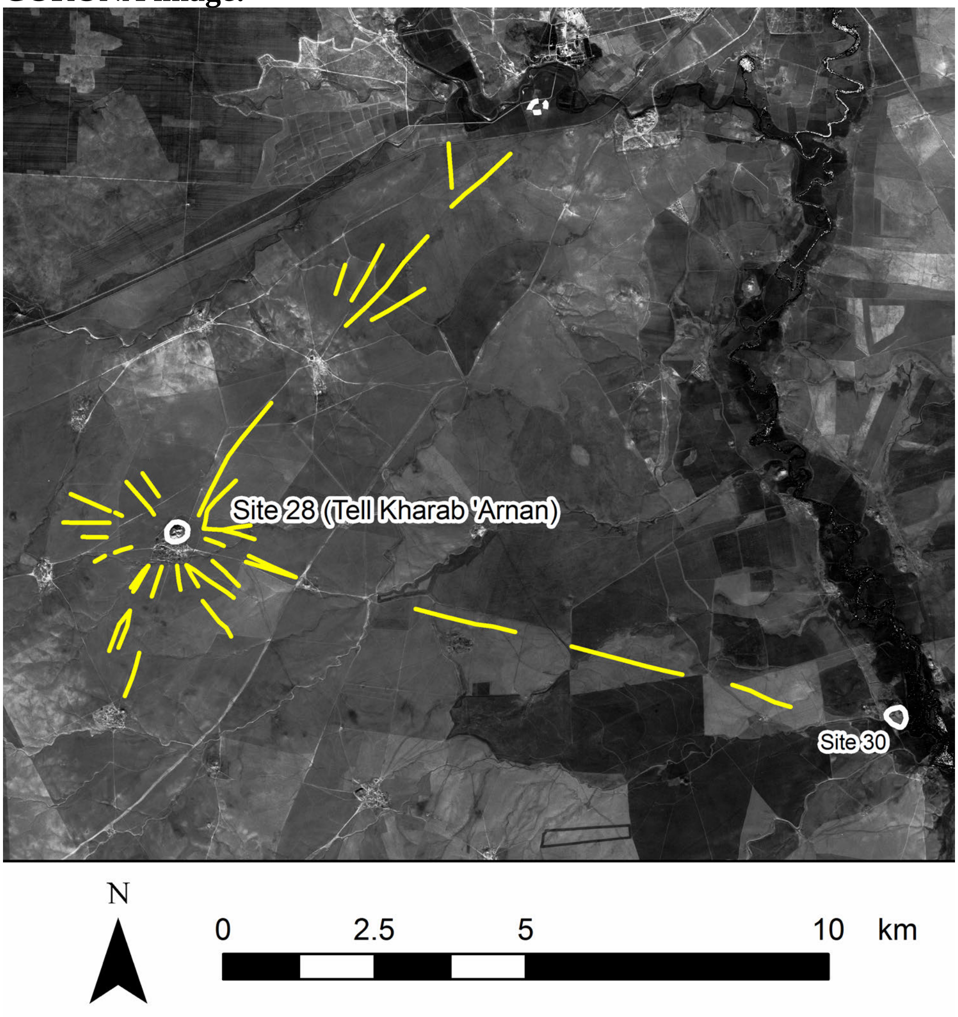
Total number of routes (after bifurcations): 24

Number connecting to other sites: at least 2

Furthest length of terminating routes: 3 km, possibly 8 km

Furthest length of site-connecting routes: 12 km

CORONA image:



Description: The most definite route in this network connecting to another site leads 12 km east-southeast to the 8-hectare tell Site 30 on the Khabur river, while another leads 8 km to a tentative site to the northeast.

Hollow Way Network 22

Associated Sites: Site 24 (Tell Abu Shakhat)

Occupation periods of associated sites: at least EBA

Number of routes emanating from the site(s): 6

Total number of routes (after bifurcations): 12

Number connecting to other sites: possibly 1

Furthest length of terminating routes: 2 km, possibly 9 km

Furthest length of site-connecting routes: possibly 9 km

CORONA image:

Description: None of the routes in this network obviously link Tell Abu Shakhat to other settlements, though the unusually great length of one running south-southwest for 9 km suggests that at least one potentially does.

Hollow Way Network 23

Associated Sites: Site 959, Site 960

Occupation periods of associated sites: not available

Number of routes emanating from the site(s): 4

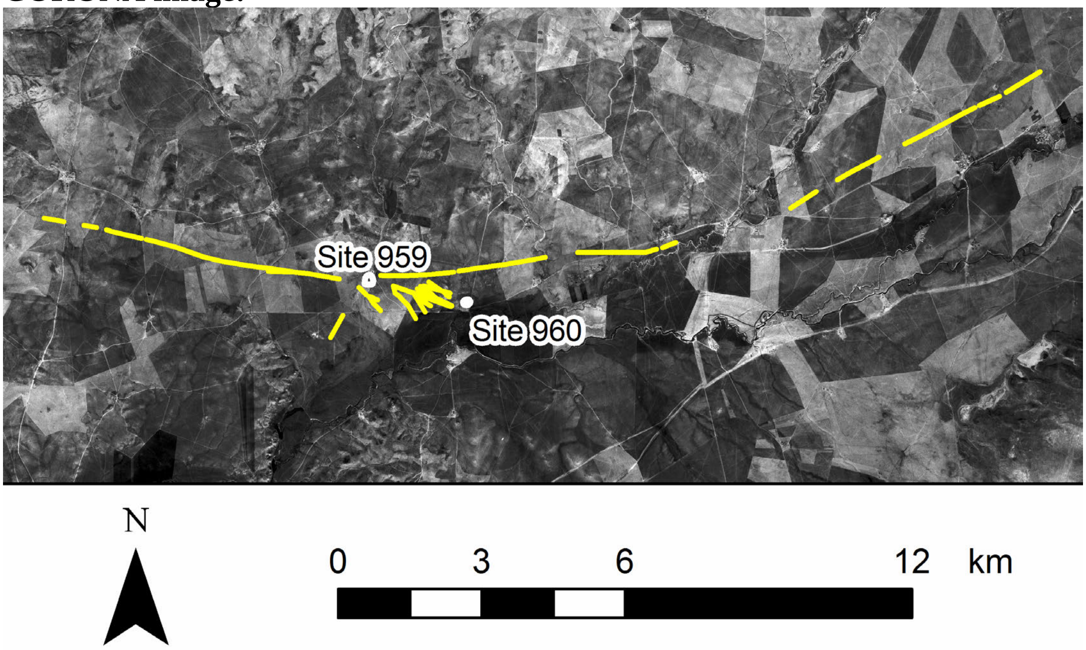
Total number of routes (after bifurcations): 10

Number connecting to other sites: 1

Furthest length of terminating routes: 1.3 km

Furthest length of site-connecting routes: 1.9 km

CORONA image:



Description: This small but dense network of hollow ways surrounds the two-tiered fortified tell Site 959 and the mounded tell Site 960, with one route directly connecting the two and numerous criss-crossing bifurcated routes between them. Meanwhile, the former site appears to be located along a major east-west route, at least 20 km of which can be traced on CORONA imagery, much of it running roughly in parallel to the main branch of the Wadi Hamar, around 1.5 km to the south.

Hollow Way Network 24

Associated Sites: Site 991

Occupation periods of associated sites: not available

Number of routes emanating from the site(s): 3

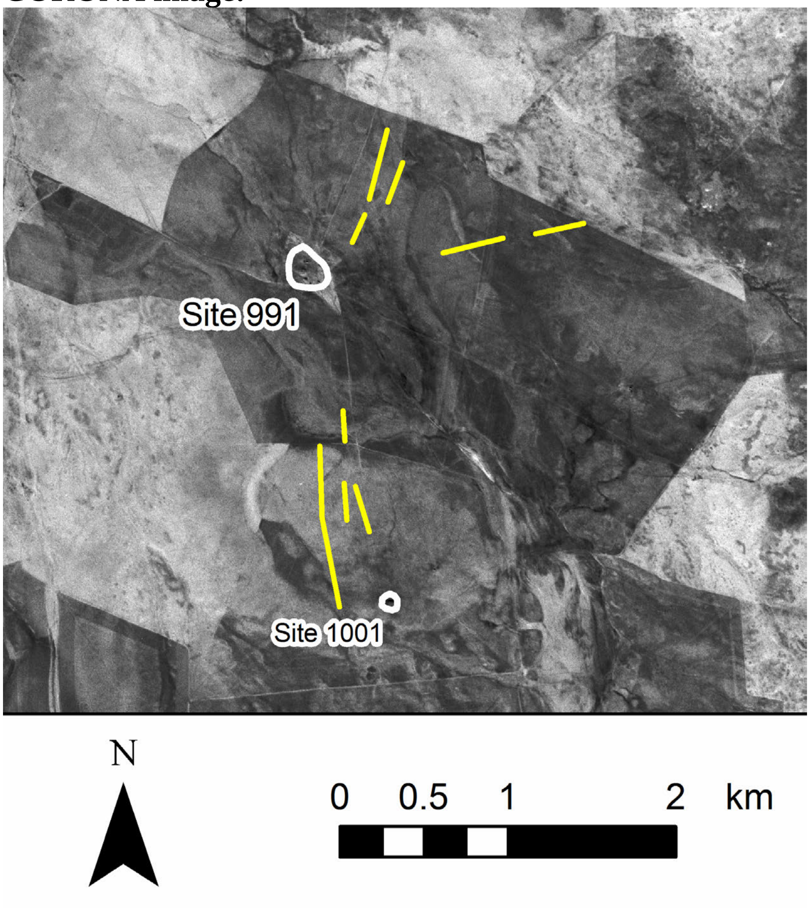
Total number of routes (after bifurcations): 6

Number connecting to other sites: 1

Furthest length of terminating routes: 2 km

Furthest length of site-connecting routes: 2 km

CORONA image:



Description: The southernmost hollow way network in the region is located around the two-tiered fortified tell Site 991. All lead north, east, or south, and one connects to the small 0.7-hectare Site 1001 to the south-southeast.

4.5.5.2. Canals

Some potential canals exist around 7 km east of the Balikh and around 10 km north of its confluence with the Wadi Hamar (Fig. 4.20). Up to 10 very straight dark lines, visible on CORONA imagery, run in several directions, sometimes crossing each other. The longest single segment traceable measures just over 3 km. If these features are indeed canals, their very good state of preservation (with none of the typical meandering erosion of ancient representations of such features), combined with their close vicinity to the major early Islamic-era sites of Medinet al-Far (111 ha) and, presumably, Site 953 (69 ha), lead to the strong probability that they date to the Late Antiquity.

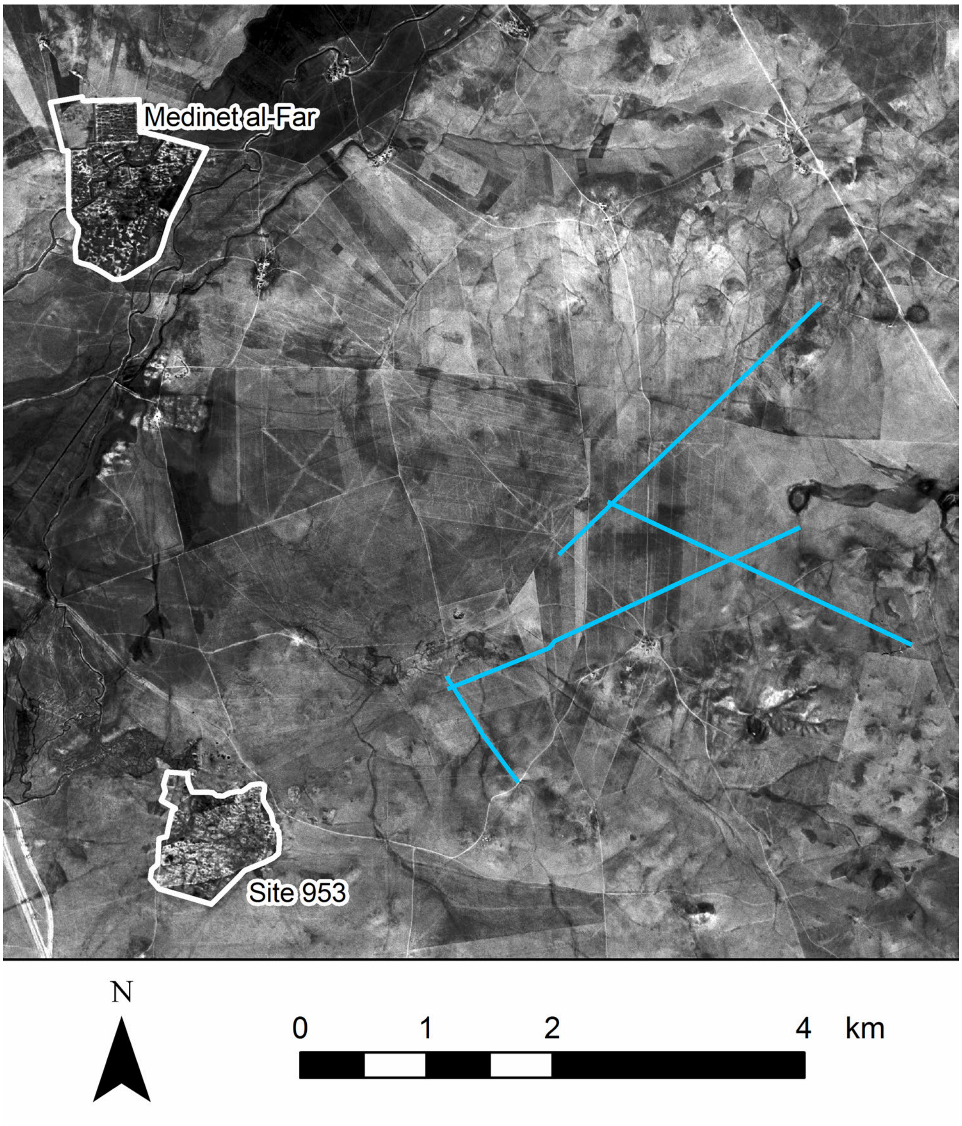


Figure 4.20: CORONA image of the presumably Islamic-era canals in the vicinity of the eastern banks of the Balikh.

4.5.5.3. Qanats

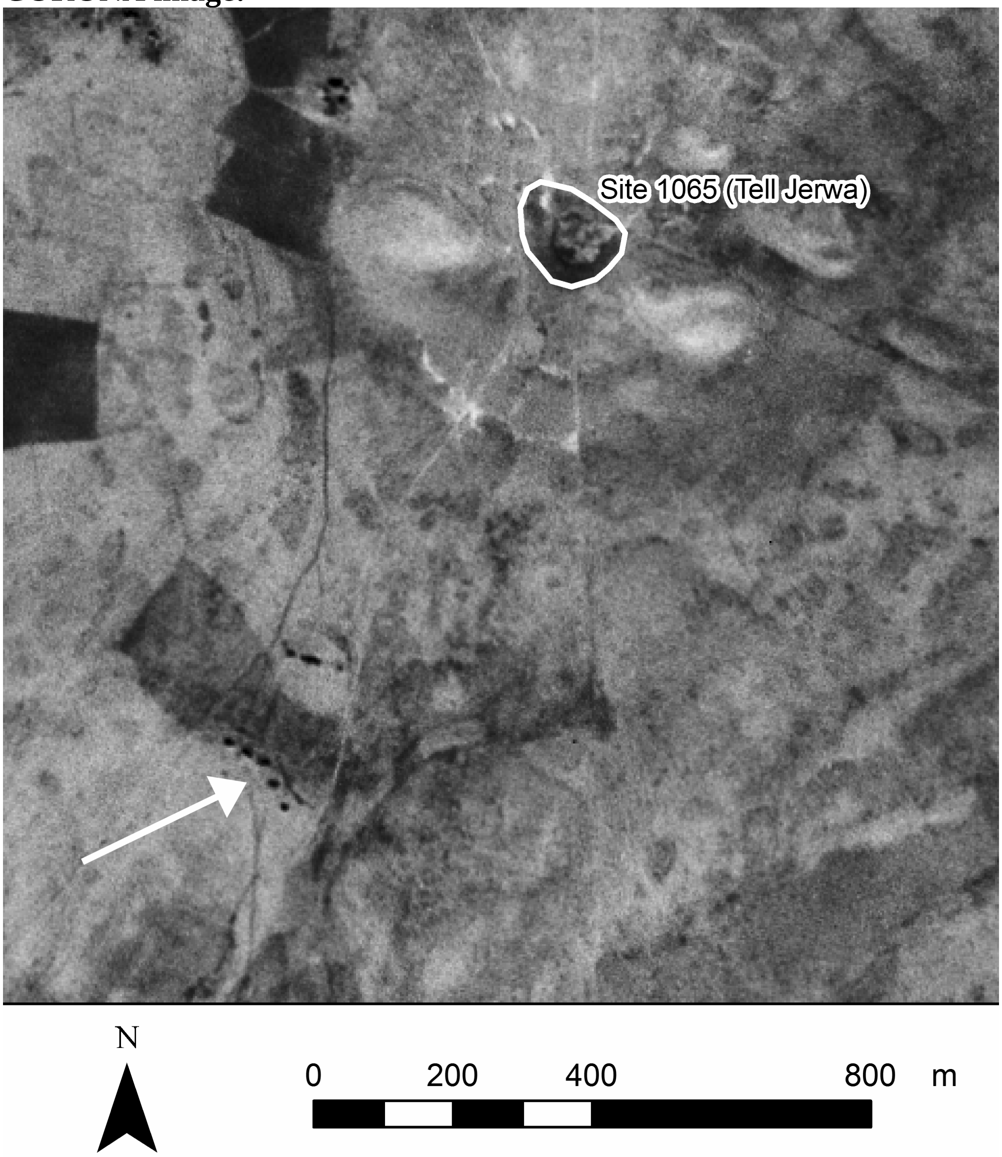
Qanat 3

Associated Sites: Site 1065 (Tell Jerwa)

Occupation periods of associated sites: not available

Traceable length: 150 metres

CORONA image:



Description: The only likely qanat in the unsurveyed area, this feature lies 20 km east of the Balikh, and a mere 800 metres southwest of the unusual Tell Jerwa. It is characterised by the typical close alignment of small mounds that indicate the spoil heaps of the shafts dug to create such a feature. Five of these run in a southeasterly to northwesterly direction. The location of a wadi at this feature's eastern edge gives further credence to its identification as a qanat. However, its short length combined with the absence of any definite or even tentative adjoining qanats or canals in the immediate area mean that little further can be said of this feature.

4.5.6. Combined Overview of Unsurveyed Area

The temporal distribution of settlements in this area is largely unknown; however some idea of the Bronze Age pattern can be gleaned from the locations of tell settlements (see Fig. 4.21), which can reasonably be expected to date to this period (see Section 3.4.2.2). These are more or less evenly distributed across the northern two-thirds of the region, exclusively above the 190 mm isohyet. Flat settlements of presumably later date (Roman period or later) have a very different pattern, with a dense concentration in the far north and a relatively sparser distribution across the rest of the landscape; including below the 190 mm isohyet. This indicates that the northern region above the 270 mm isohyet saw a significant increase in settlement during later periods compared to the Bronze Age or Iron Age. Based on the results of the Wadi Hamar Survey, this is most likely a representation of extremely high density Islamic-era settlement (see Kudlek 2006: 121). Settlement in the remainder of the Western Jazira remained of roughly equal density during this time, however the extent of the settled regions was expanded, with the southernmost arid areas becoming occupied.

Large tell sites, meanwhile, are divided into two distinct latitudinal zones: the northern area and the "Malhat line". The first of these sectors, north of the 260 mm isohyet, is also the location of all of the unsurveyed region's hollow ways, as well as those within the Wadi Hamar Survey (see Section 4.4.5.1; Fig. 4.22). Six of the eight tells over 10 ha in size feature hollow ways emanating from them, three of which form extensive networks. These sites all lie within a few kilometres of either the Khabur or major branches of the Wadi Hamar. The four large, two-tiered fortified tells situated in alignment along the "Malhat line" are in a region receiving between 200 and 210 mm of annual precipitation, but have access to shallow groundwater and run-off from the Jebel Abd al-Aziz and Tual 'Abah, much of which collects in a single east-west flowing seasonal wadi.

Section 4.6: Conclusion

The overall archaeological landscape of the GWJ is a varied one, but forms a pattern that indicates far greater past human occupation than many previous studies have surmised (Fig. 4.21). The total number of archaeological features identified, of all kinds and from all periods, is 1127. The greatest concentration of these is in a latitudinal band of roughly 20 km width adjacent to the Syro-Turkish border; the northern boundary of the region. This is most pronounced in the areas around the Wadi Hamar, but still very apparent immediately east and west thereof. West of the Balikh, this high-density band still exists, however it is

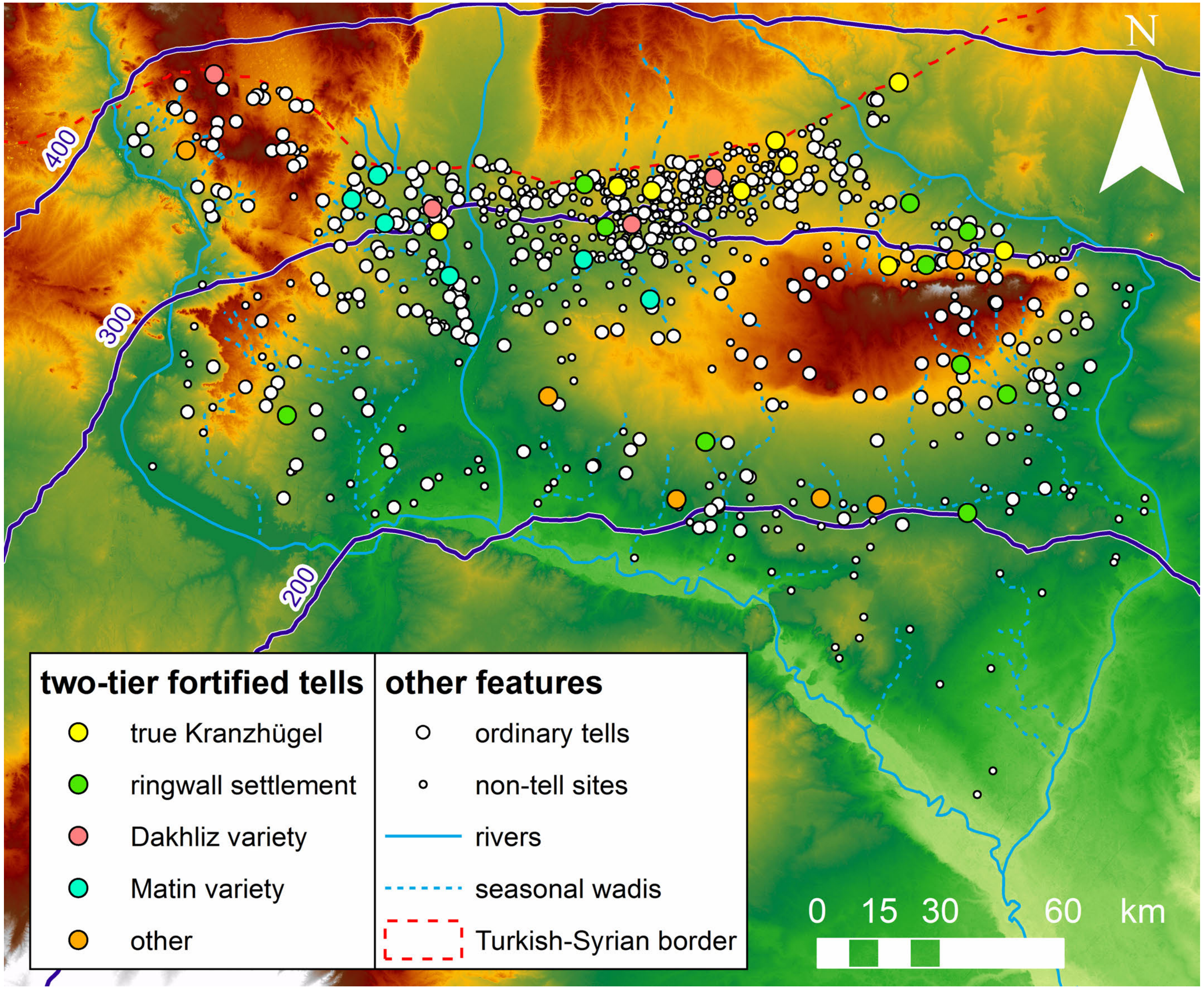


Figure 4.21: ASTER map of the GWJ showing all sites identified by this thesis' survey, divided by site type. Isohyets from the GPCC.

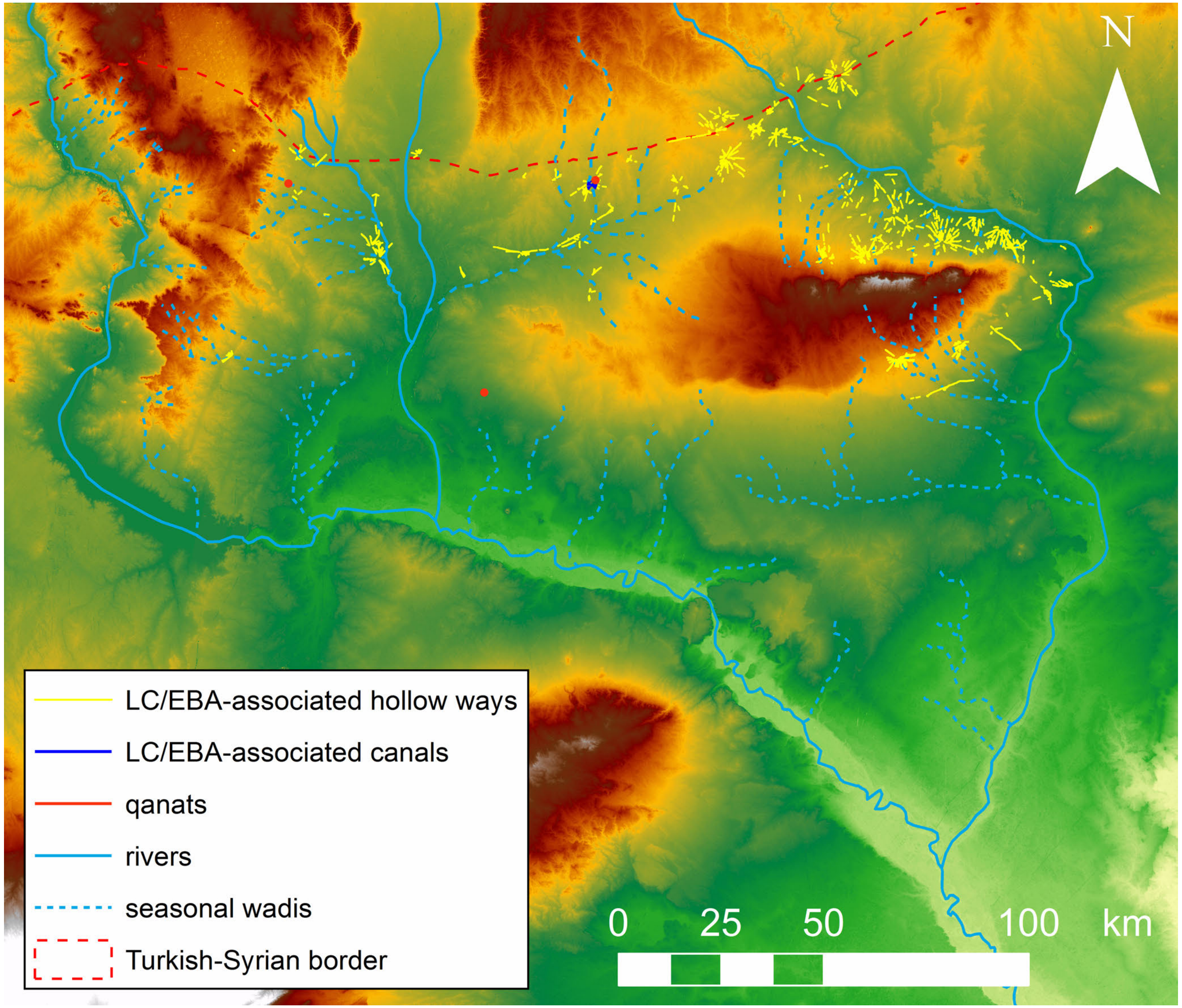


Figure 4.22: ASTER map of the GWJ showing all inter-site features identified.

about twice as wide in a north-south direction; much of it corresponding with the fertile lowland region between and around the Balikh and Qaramukh rivers. Of slightly lower density is an area of around 40 km north and south of the Jebel Abd al-Aziz. South of the northern band, and away from the *jebel*, site density is significantly lower; by roughly 50%. South of the 200 mm isohyet, roughly 80 km north of the confluence of the Khabur and Euphrates, the density roughly halves again, remaining consistently sparse throughout this arid region.

Inter-site features in the GWJ are relatively few and far between, appearing in clustered groups (Fig. 4.22). This is particularly the case with hollow ways, whose distribution is very different from the uniform dense spread of these features in the Khabur river basin to the northeast. The great majority of these routeways are located in the northeast of the Western Jazira, with the northern foothills of the Jebel Abd al-Aziz featuring the largest concentrations. Others are mostly found south of the Jebel Abd al-Aziz, in the Balikh-Qaramukh region, and around the Wadi Hamar; all regions with high concentrations of settled area. Landscape transformation caused by later intensive Islamic-era settlement attested to by the Wadi Hamar Survey (Section 2.1.4.7) may have contributed to the scarcity of visible routeways in that region at least; however similar destructive processes occurred to an even greater intensity in the Khabur river basin, where numerous hollow ways are discernible on satellite imagery (Section 1.2.4). Evidence for canals and qanats is even sparser, with only a handful of examples present.

These results obtained from the combined ground truth and remote sensing data available for the GWJ provide a wealth of information. When one considers the area under study in its entirety, a dense and complex pattern of past human activity emerges. Taking into account the full level of both breadth and detail gleaned from the sources used and disseminated above, an overall analysis of this pattern is perfectly feasible, even including that within the largely unexplored areas. This is carried out in the next chapter.

Chapter 5
Analysis and Discussion

Section 5.1: Introduction

5.1.1. The Necessity of Re-analysis

The results gathered in the previous chapter were drawn from a large variety of sources, each of which presented their findings in different ways. This resulted in more work being needed to create a unified workable database than simply the collation of three different surveys. The varying publication states of these surveys additionally constrict the fullness of available data, as does the difficulty of accessing their reports. In addition to requiring translation between two languages, raw data needed to be teased out from narrative descriptions (e.g. Einwag 1993; Kouchoukos 1998) and unified with surveys only available as raw data (e.g. the Wadi Hamar Survey). However, re-analysis within the confines of the survey data itself only provided a subset of the entire dataset, the rest coming from individual ground truth reports, brief mentions in analyses of other regions, and most importantly the supplementation of remote sensing data.

Thus even when discounting the previously unstudied regions covered by this thesis, the re-examination of existing data proved essential to allow interpretations to be made beyond the geographical, temporal, and research boundaries of initial publications, such as they exist. These range from practical, such as the limitations of surveys conducted before the ready availability of satellite imagery and GPS, to self-imposed, such as the exclusive focus on EBA sites by the Sweyhat Regional Reconnaissance. In order to allow for a workable wider contextualisation, the addition of remote sensing data, most notably CORONA imagery, was essential, as it enabled a holistic view of the entire landscape of the Greater Western Jazira. While several gaps in ground truth data lead to, for example, a paucity of dating evidence in some regions, this re-analysis supplemented by my own study takes the previous data to a point where it can be properly integrated into regional research.

5.1.2. Discussion Structure

The following dissemination of this thesis' results is first and foremost ordered topically by the analyses carried out. First, settlement dynamics across all periods are considered within the framework of settlement sectors, before calculations relating to the

EBA archaeological landscape are conducted, followed by a dissemination of likely economies relevant to human subsistence across the region. For this section, the results are split up semi-geographically, determined not by physical location or topographical area, but by the density of sites and differing landscapes. The decision to not structure this discussion by time periods was made due to the imprecision of dating evidence from the majority of the region – with the exception of a handful of sites in the Wadi Hamar and Yale Khabur Surveys, the narrowest definition of human occupation of sites during the late 5th-3rd millennium is “Late Chalcolithic” and “Early Bronze Age”. However, geographical divisions based on survey areas, although necessary for the dissemination of results in Chapter 4, would be too arbitrary, especially as they are vastly different from each other in size and landscape type. Thus regional sector divisions were chosen based on the results as they emerged, rather than being pre-selected. These provide a basic structure; however for the purposes of certain analyses they were further subdivided as required.

Second, two prominent alignments of major settlements are analysed separately, and the economies leading to their existence similarly discussed. Particular attention is given to their potential connections with sites far beyond the region of study, given the high probability of trade routes having contributed to their formation. Following this, comparisons to other regions in the vicinity of the GWJ are examined, leading into theoretical models and, in the next chapter, the wider context.

Section 5.2: Analyses Based on Site Distributions

5.2.1. Settlement Sector Definitions

The settlement sectors discussed here are comprised of the *northern*, located within 30 km of the Turkish border and largely north of the 270mm isohyet, the *central*, dominated by the Jebel Abd al-Aziz to the east and the Sarugh and southern Balikh-Euphrates uplands to the west, and the *southern* mostly south of the 210mm isohyet (Fig. 5.1).

5.2.1.1. *Northern Sector*

This zone is very clearly delineated by a strong concentration of settlements close to the Turkish border with a combined average density of 0.107 sites per km^2 (ca. one site per 10 km^2) across all periods (Fig. 5.2). At its widest point, this band has a north-south width of 25 km to the east of the Balikh, 45 km to its west. It incorporates all of the Wadi Hamar

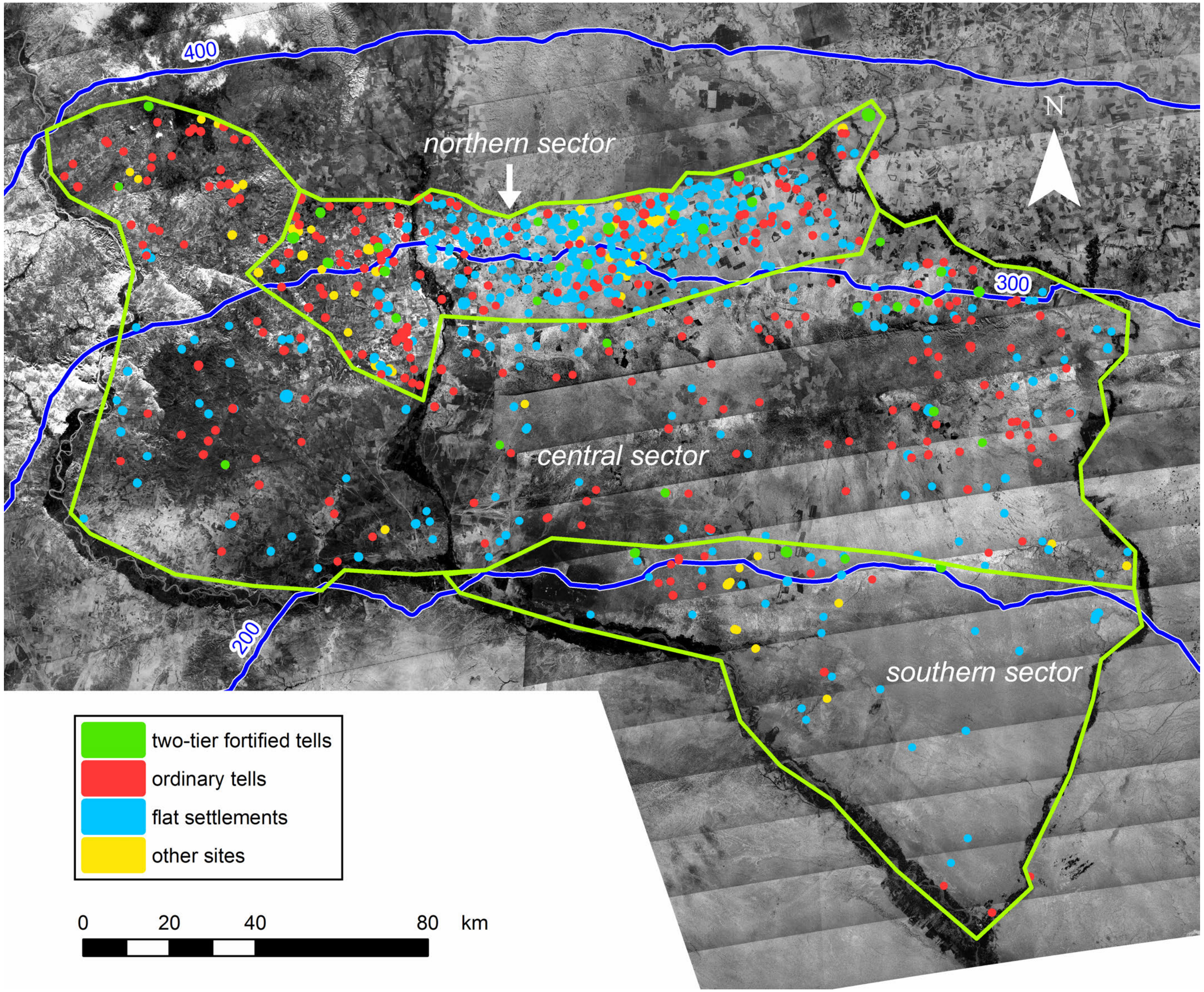


Figure 5.1: CORONA satellite image of the GWJ showing the three sectors of settlement identified by this analysis. Isohyet values from the GPCC.

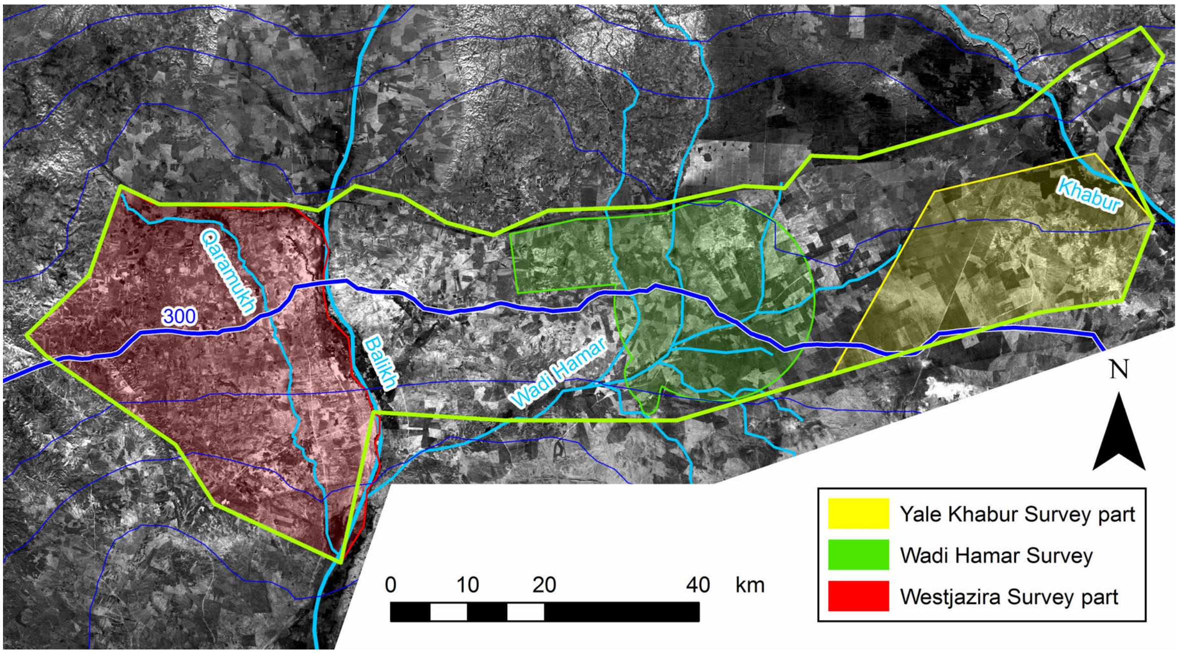


Figure 5.2: CORONA satellite image of the GWJ showing the *northern sector* of settlement. Minor isohyets are at 20 mm intervals. Isohyet values from the GPCC.

Survey, the northwestern corner of the Yale Khabur Survey, and the eastern half of the *Westjazira* Survey. The landscape is predominantly one of level, seasonally-watered plains. Four major river systems contribute to the fertility of the *northern sector*: the Qaramukh, Balikh, Wadi Hamar, and Khabur. These perennial and seasonal watercourses provide the possibility of limited, but relatively stable agriculture, as well as pastoral lands for herd grazing (see Section 1.2.2.3). In addition, this region receives more rainfall than almost any other part of the GWJ (with the exception of some of the Sarugh; see below). Though the range of rainfall across the width of the *northern sector* consistently remains within the margin of a semi-arid landscape, it is relatively high, ranging from 240 to 350 mm per year. Thus the stark uniformity of dense settlement is perhaps more likely to be the result of the abovementioned river systems, especially as the southern areas around the 250 mm isohyet would have been prone to drought. Further evidence for the importance of these watercourses comes from the Wadi Hamar Survey, where three quarters of tell sites are situated directly on branches of the eponymous wadi (see Section 4.4.2.3). However, the combined factors of intermittently favourable precipitation and easily accessible water sources no doubt functioned in tandem to create the patchwork visible in the archaeological record. As evidenced at Tell Chuera, the digging of wells also helped mitigate the effects of drier years (Tamm 2010).

5.2.1.2. *Central Sector*

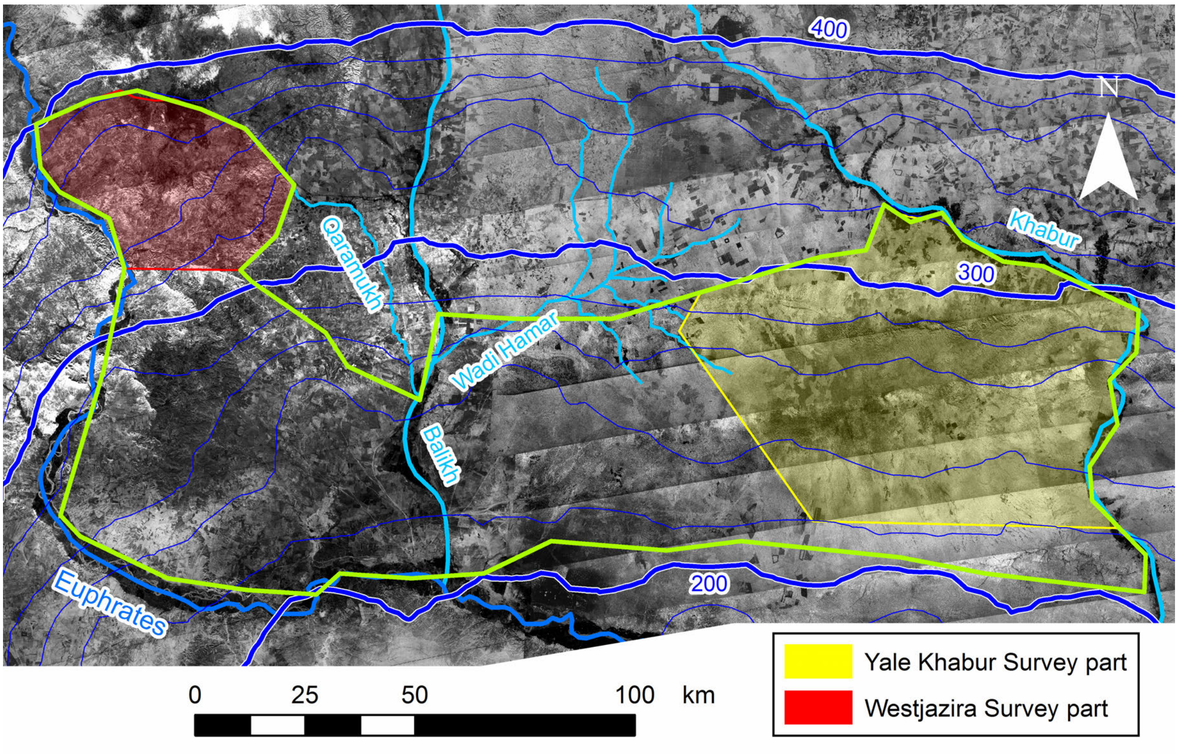


Figure 5.3: CORONA satellite image of the GWJ showing the *central sector* of settlement. Minor isohyets are at 20 mm intervals. Isohyet values from the GPCC.

The *central sector* is mostly located roughly between the 210 and 300 mm isohyets, but is more importantly marked by mountainous terrain and a uniform settlement concentration of medium density, on average 0.017 sites per km^2 (ca. one site per 60 km^2), or around a sixth of that in the *northern sector* (Fig. 5.3). It incorporates the vast majority of the Yale Khabur Survey, the western half of the *Westjazira* Survey, and the entirety of the Sweyhat Regional Reconnaissance. The region can be considered more marginal than the *northern sector*, in part due to its lower precipitation levels but also as it contains only seasonal watercourses (see Section 1.2.2.3). To the east, the Jebel Abd al-Aziz dominates, while west of it the Tual ‘Abah mountains provide a similar landscape. According to Kouchoukos (1998: 387-393), the locations of medium and large sites in this area were prescribed by the few locations which not only contained sufficient water sources, but also the soils to enable agriculture. Such locations exist across this part of the *central sector*, even in the otherwise arid southern piedmonts of the *jebel*. Surface runoff is the major contributor to water accessibility here, with precipitation on the uplands collecting in shallow seasonal lakes and charging localised gypsum aquifers (*ibidem*: 383-386).

West of the Balikh, the terrain is more uniformly, but less prominently mountainous; a large plateau-like upland covering the entire Balikh-Euphrates region. As above, settlements in this area likely also depended heavily on rainfall runoff from uplands, and their locations are again prescribed by its availability. However, in the absence of fertile gypsum sinks, sites are not clustered in patches, but run along bluffs on the banks of seasonal wadis (Danti 2000: 266-267). Additionally, the geology of these locations creates a shallower water table, which was doubtless taken advantage of by digging wells, as is still the case in the modern day (*ibidem*: 279-280).

Also included in the *central sector* are the Sarugh uplands in the northwestern Balikh-Euphrates steppe. Despite their situation well above the 300 mm isohyet, their topography and settlement density are closer to that of the areas mentioned above than the *northern sector*. Due to the increased precipitation levels, settlements in this region were probably less reliant on runoff from the uplands; which nevertheless exists (Einwag 1993: 27).

5.2.1.3. *Southern Sector*

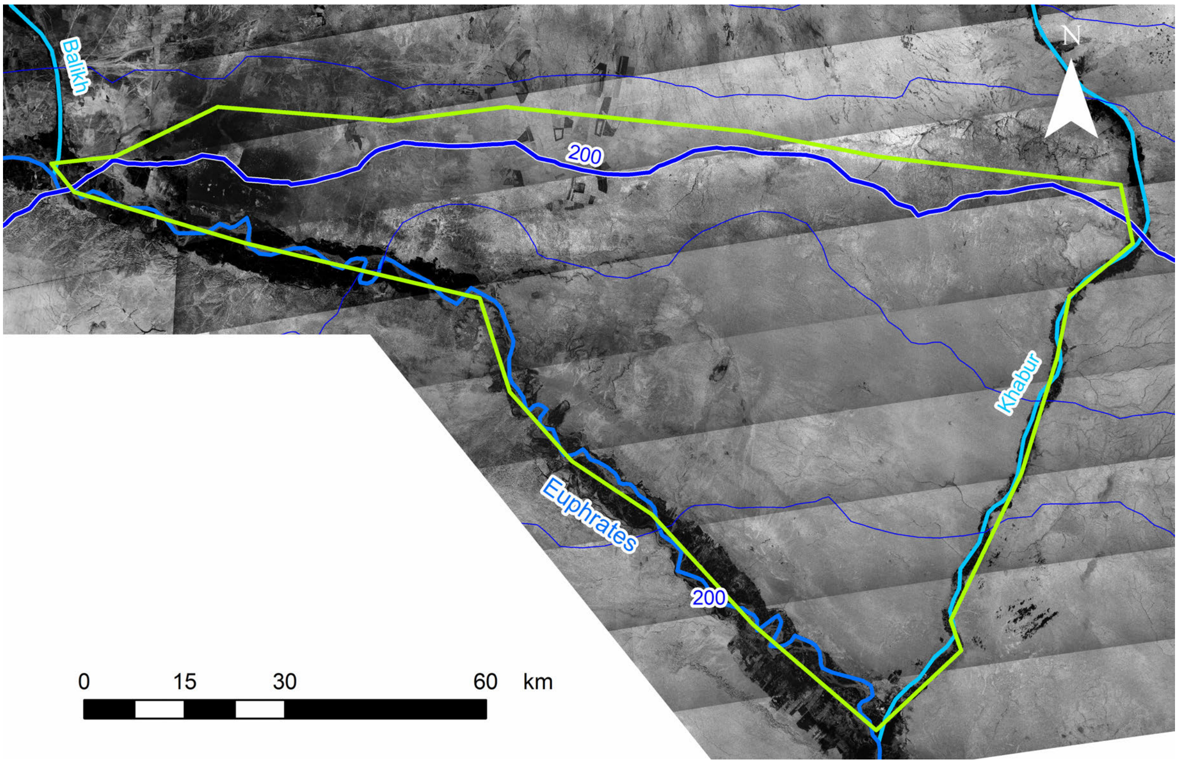


Figure 5.4: CORONA satellite image of the GWJ showing the *southern sector* of settlement. Minor isohyets are at 20 mm intervals. Rainfall isohyet values from the GPCC.

South of the 210 mm isohyet, the settlement density drops significantly. This southern region is located entirely within the southeastern triangle formed by the courses and confluence of the Khabur and Euphrates (this being located around the 140 mm isohyet), with its westernmost point at the mouth of the Balikh (Fig. 5.4). This settlement sector is defined by a very low density of settlement, just 0.008 sites per km^2 (ca. one site per 125 km^2), or roughly half of that in the *central sector*. Geographically, it consists of a very uniform flat steppe landscape, the only variation in which is the volcanic Menachir mountains at its far western end (see Fig. 1.6). The entire *southern sector* is located in the unsurveyed portion of the Western Jazira, covering roughly half of this. While the abovementioned gypsum aquifers charged by runoff from the Jebel Abd al-Aziz provide some water sources in the northernmost parts of the area, as do basin depressions allowing access to groundwater (Kouchoukos 1998: 386-387), these fail to reach the majority of the *southern sector*. Thus sedentary human occupation of this region is limited to the ability to construct wells to provide water, as evidenced by the importance placed on their location by many early explorers of the Western Jazira, who mentioned them in their reports (Section 3.3.3.1) and maps (Section 3.3.2.1).

5.2.2. Settlement Dynamics

5.2.2.1. Settlement Periods Recorded

The earliest recorded period in the *northern sector* is the Palaeolithic, identified at three sites in the northern Yale Khabur Survey area. The first period of widespread occupation, however, appears to have been the Halaf, while the following Ubaid saw a slightly smaller number of occupied sites, and the LC much fewer still. Following the well-documented widespread occupation during the EBA, an at least moderate density of occupation was recorded in every subsequent period up to and including the Islamic era.

The periods of settlement recorded in the *central sector* are much the same, but differ following large-scale EBA occupation, with the MBA represented at only one site while the LBA was not recorded at all. Settlement during the Iron Age and Roman/Byzantine periods again matches the pattern of the *northern sector*. The only recorded periods in the *southern sector* are the EBA and Iron Age, at Khirbet Malhat.

Analysing the number and areas of settlements over time is only possible in regions that have been surveyed, where not only the occupation periods of sites have been recorded, but the total area of the settlements' distributions can be calculated. For the *northern sector,* these include parts of the Yale Khabur Survey, the *Westjazira* Survey, and the entirety of the Wadi Hamar Survey (see Fig. 5.2); a combined area of 2594 km^2. The remaining area of the *Westjazira* Survey, as well as the bulk of the Yale Khabur Survey (see Fig. 5.3), are encompassed in the *central sector,* measuring 6924 km^2 in total. The *southern sector* does not include any of the surveyed areas, and must thus regrettably be for now excluded from such temporal-based analyses.

5.2.2.2. Analysis of Settlement Densities over Time

One of the most basic settlement analyses that can be conducted with the data available is the density of their numbers over long-term archaeological periods (Fig. 5.5). Also feasible are examinations of settled area densities over the same time periods (Figs. 5.6 and 5.7). More comprehensive examinations are possible, however more limited in scope. Of the 90 dated LC and/or EBA sites in the GWJ, only 44 have been investigated in enough detail to allow for subdivisions of phases during those periods. Unfortunately, with only five sites with recorded individual LC phases, only the EBA can be used for a regional analysis. Additionally, those that do have this sufficient degree of detail can only be analysed by the density of their numbers, rather than settled area, as this latter data is incomplete (Fig. 5.8).

The pattern of both settlement numbers and settled area over time periods matches the expected boom-and-bust cycle of human occupation in the GWJ. As is clearly visible in Figure 5.6, both the *northern* and *central sectors* saw the density of settled area steadily decrease from the Halaf to the LC. The density of settlement numbers follows a similar pattern, with the slight difference of a small increase between the Ubaid and LC periods in the *central sector* (Fig. 5.5), due mostly to the relatively large size of the LC settlement at Tell Hajib (see Einwag 1993). Just five sites in the *northern sector* were dated to the latter period, and only three in the (much larger) *central sector*. Both the number and area of settlements increase dramatically in both zones during the subsequent EBA. This is better illustrated by examining just the five sites with recorded phases of LC settlement, which shows the complete lack of late LC occupation even at sites with LC material; a proxy for the entire region (Fig. 5.9). The following MBA meanwhile sees these return to very similar values as during the LC (though the *northern sector* retains twice as much settled area as that of the LC). Thus the EBA stands out as a significant peak in human settlement bookended by periods of very little occupation.

These complementary dynamics, measured both by settlement numbers and settled area, indicate a region that saw much human migration to and from it, or at least to and from permanent settlement within it. In contrast to patterns in the *zone of stable settlement* (see Section 5.4.1.1; Fig. 5.23), data from the GWJ suggests that its periods of intense occupation saw a significant increase in the settled population of the area. Since the rate of indigenous population growth in agricultural societies has, with very few exceptions, been measured at 1% per year or less (Chamberlain 2006: 64-67), this was doubtless the result of a movement of people into the region. Conversely, the periods of limited settlement

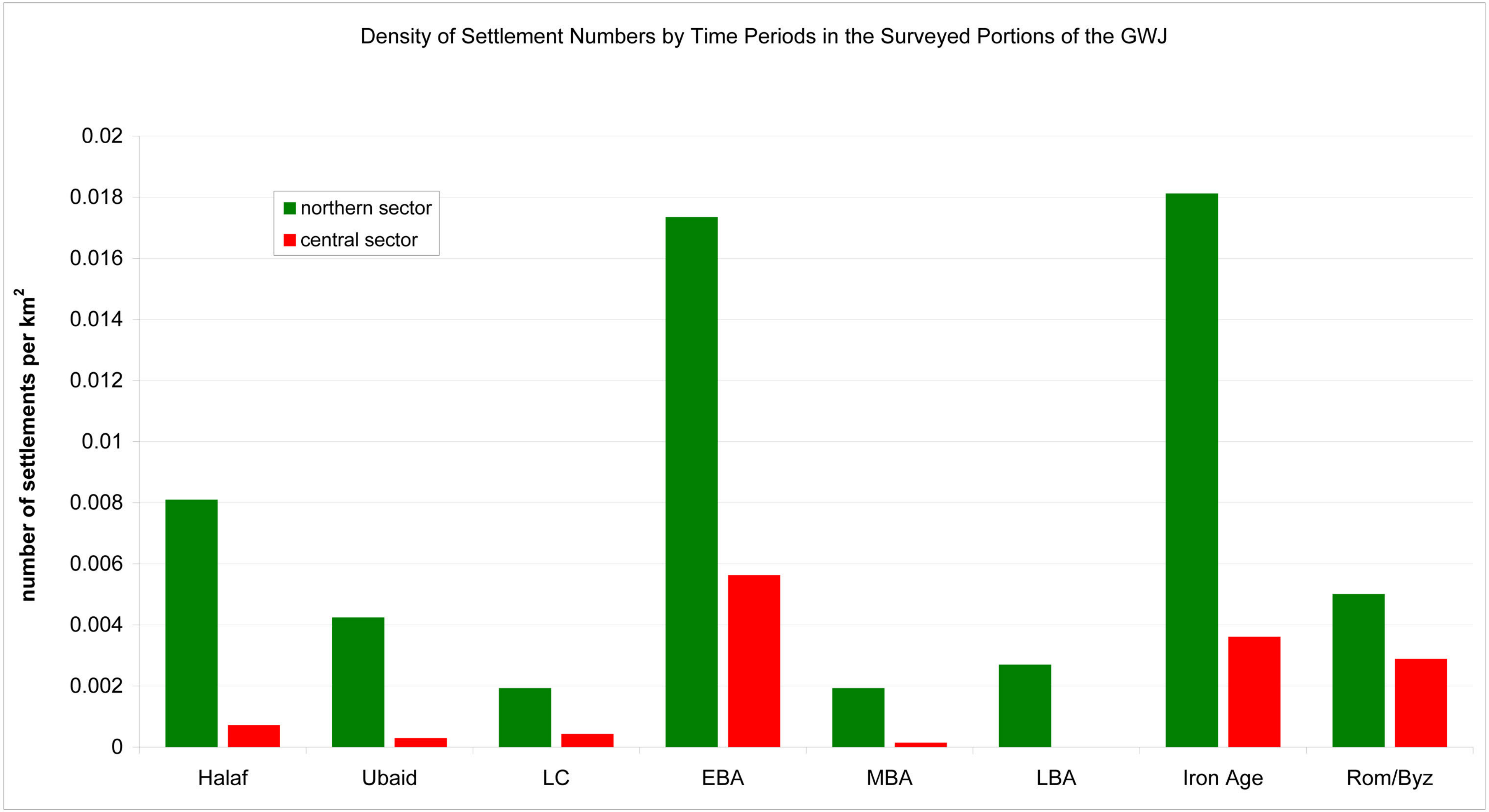


Figure 5.5: Graph of the density of the number of settlements in surveyed portions of the GWJ over time periods.

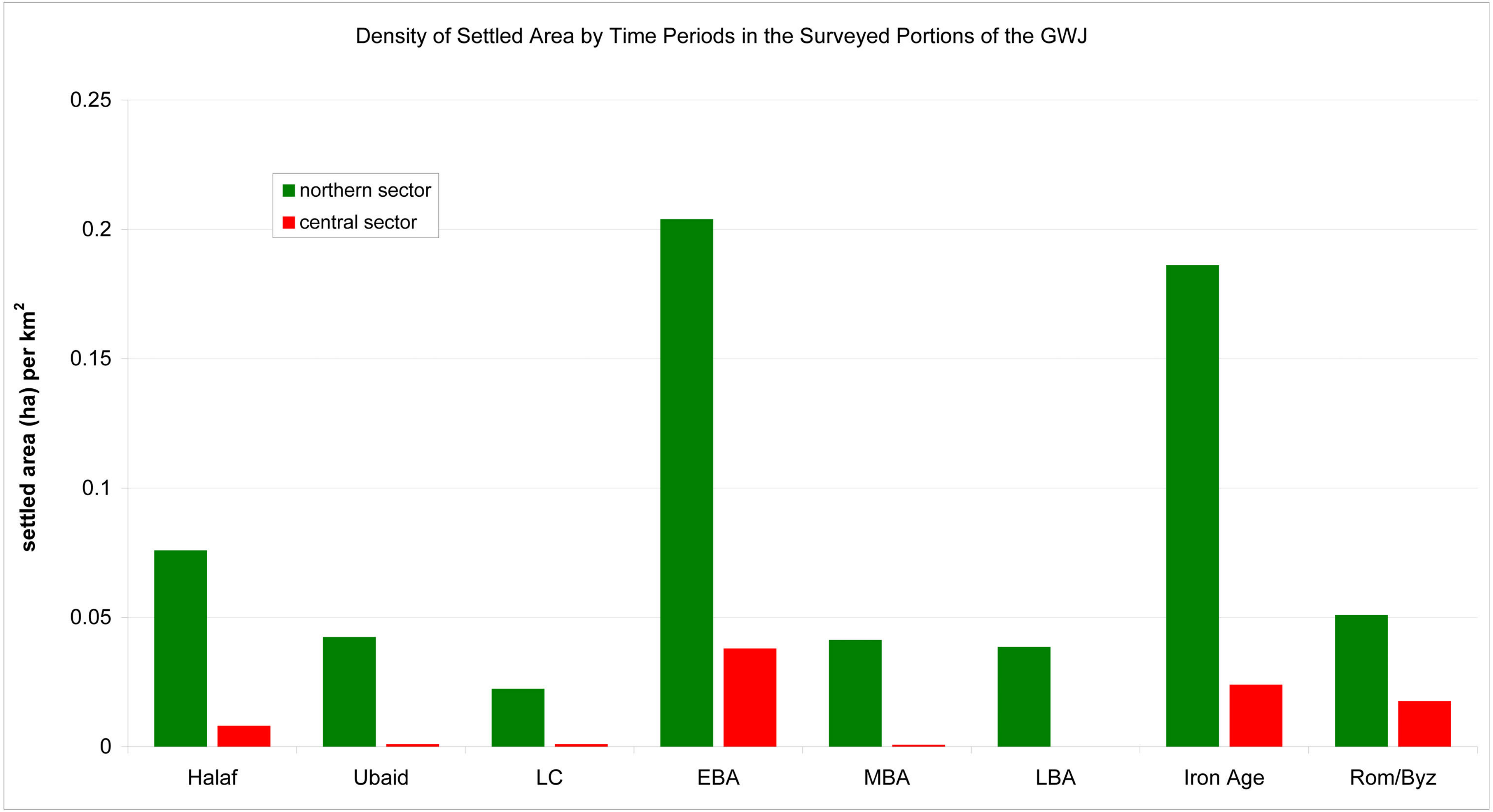


Figure 5.6: Graph of the density of settled area in surveyed portions of the GWJ over time periods.

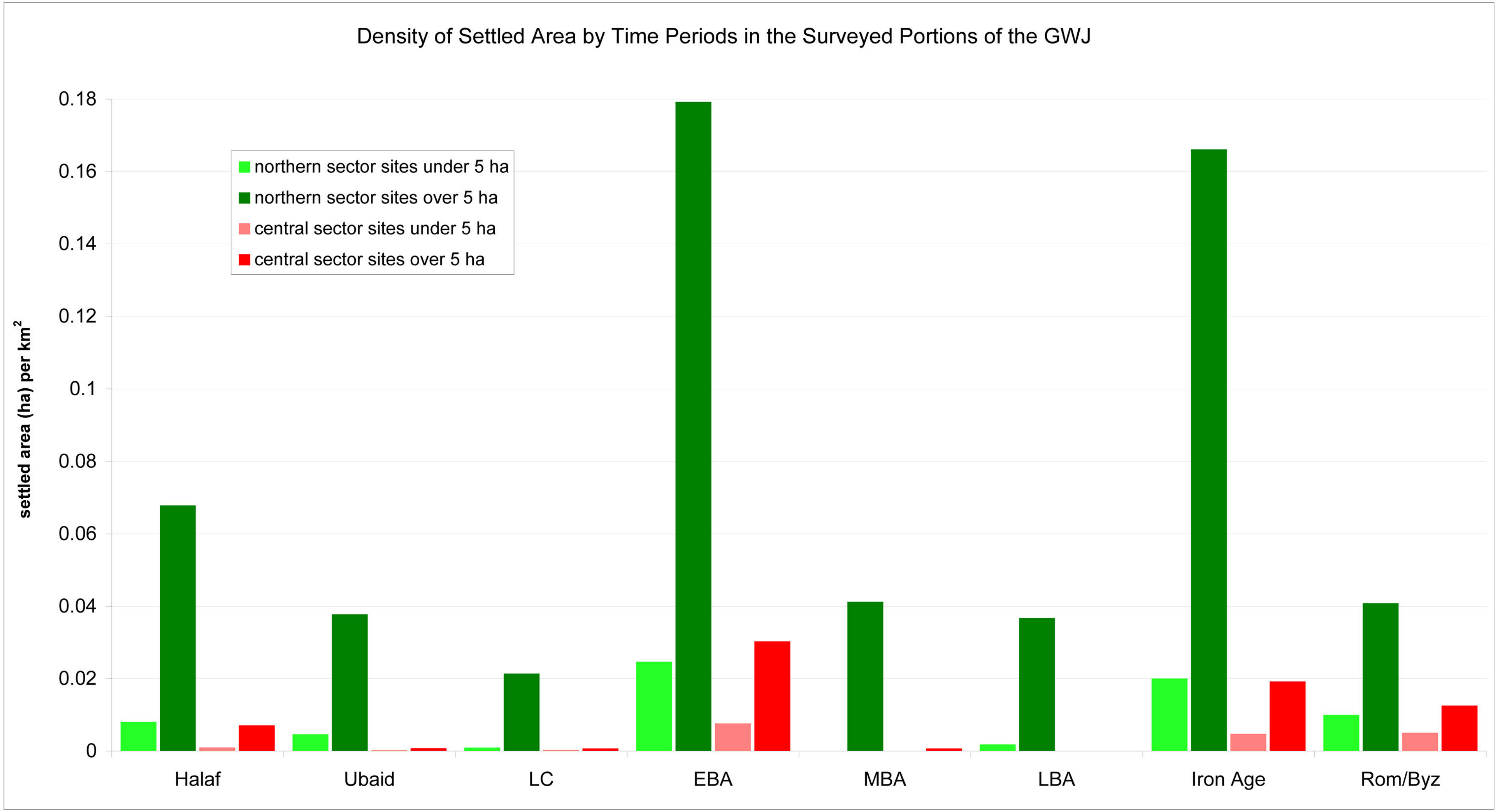


Figure 5.7: Graph of the density of settled area in surveyed portions of the GWJ over time periods, separated by large and small settlements.

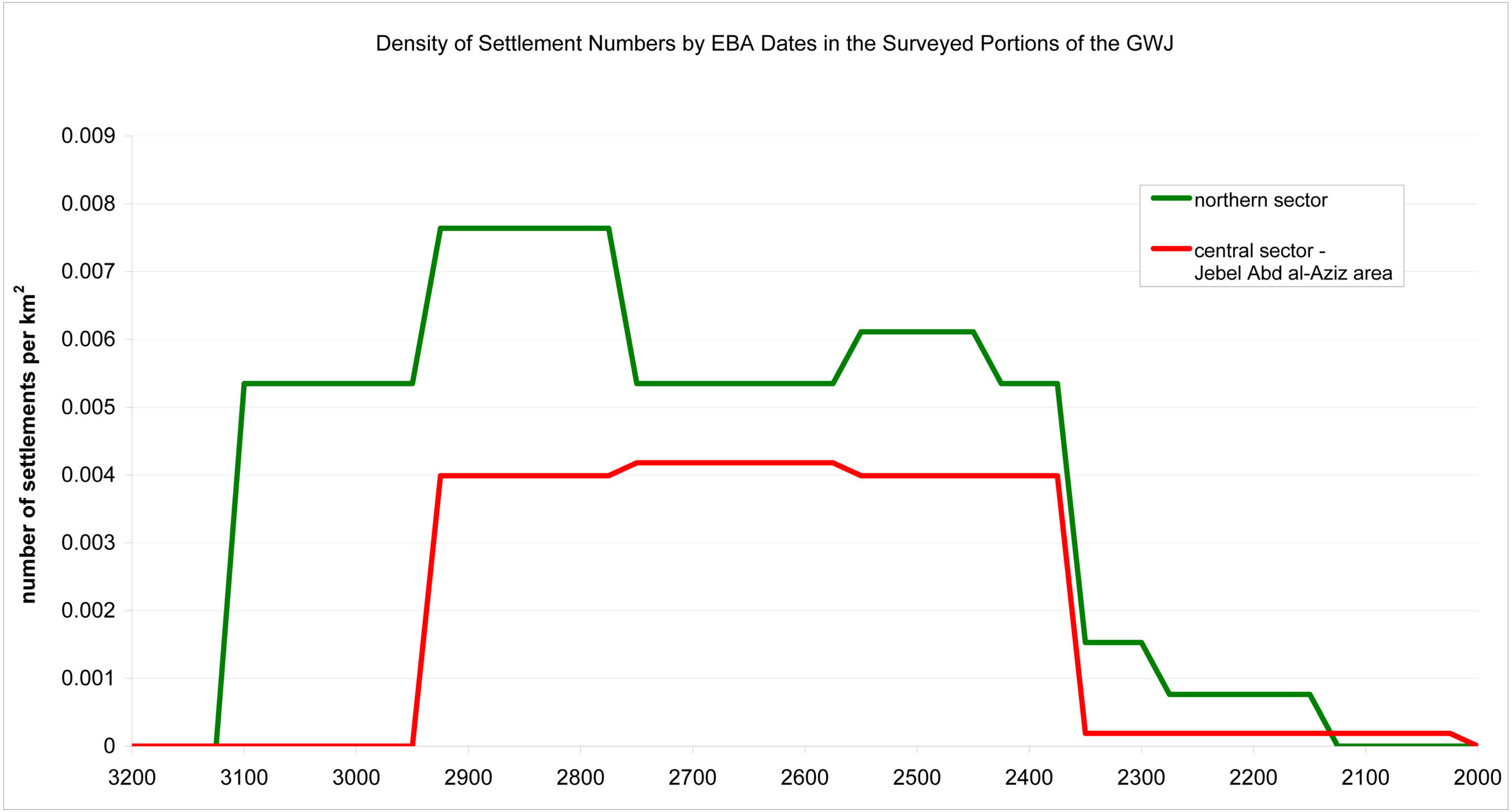


Figure 5.8: Graph of the density of the number of settlements in surveyed portions of the GWJ over 25-year time blocks within the EBA.

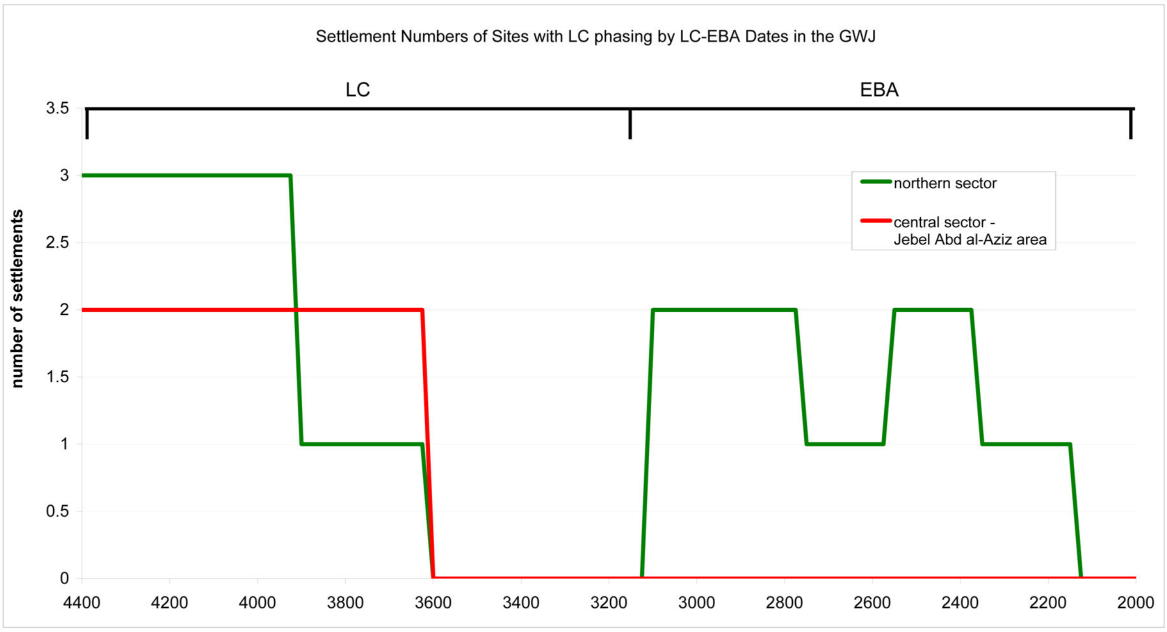


Figure 5.9: Illustrative graph showing the late 5th to 3rd millennium settlement dynamics of the five sites in the GWJ with recorded separate LC phases of occupation.

appear to have resulted from an abandonment of the region. It is of course possible to argue that this is more an indication of the establishment of an urban lifestyle and a subsequent return to nomadism, however, as discussed in Section 5.4.2.2, this valid model is problematic in this specific case.

While this early EBA growth is represented by an 800% increase in site numbers in the *northern sector*, this is somewhat more drastic in the *central sector*, which features a 1200% increase. This is mainly a reflection of the extreme dearth of recorded LC activity in the latter region; however the values are broadly comparable. Furthermore, the surveys conducted in this zone are large-scale and less intensive, and also contain only one excavated site. In the *northern sector*, it was primarily the intensive Wadi Hamar Survey, as well as excavations at Tell Chuera and Tell Tawila, that produced the LC occupation evidence.

The early EBA growth in settled area in the *northern sector* is at 812% nearly identical to its levels of settlement numbers increase. By contrast, the *central sector* undergoes a settled area increase of 3657% – not only greater than that in the *northern sector*, but much higher than its own growth in site numbers. These figures would seem to indicate that the EBA settlements established in the latter zone were on average larger. However, this must again be viewed through the lens of less intensive survey results, which naturally cause bias towards more prominent (i.e. larger) sites. Nevertheless, a look at a histogram of EBA site areas reveals that their overall size distribution in the Jebel Abd al-Aziz region is somewhat more evenly spread in the central third percentile than in the *northern sector*,

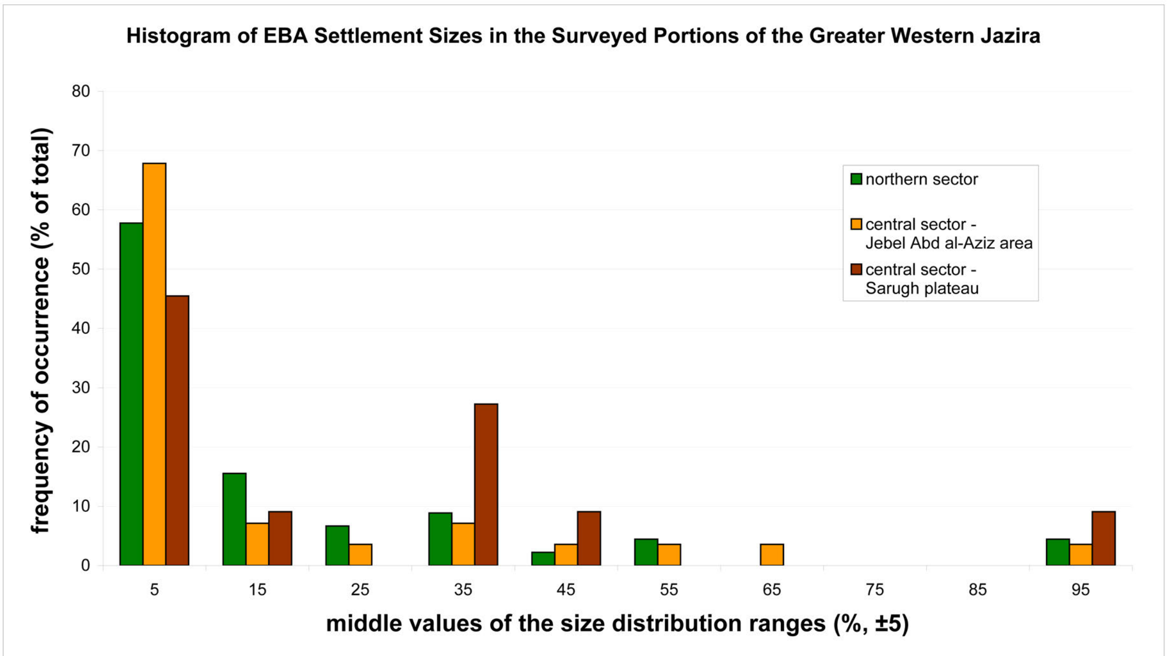


Figure 5.10: A histogram of the grouped frequency distributions of EBA settlement sizes in surveyed portions of the GWJ.

while featuring fewer medium-sized sites in the 10-40% size distribution range (Fig.5.10). The Sarugh region of the *central sector*, on the other hand, features as much larger percentage of medium-sized sites, particularly in the 30-50% range.

These values make sense when one considers the sparseness of settlement in the *central sector*, coupled with the climatic conditions of each area. With only a handful of towns or cities present in any given area of habitation, it naturally follows that those existent would either stay small or grow to large sizes, provided two factors are true: first, adding to the population of a large settlement was easier or more desirable than establishing a new village or hamlet, and second, the numbers of migrants remained high enough to cause such a demand. With water sources being at a premium in the more arid Jebel Abd al-Aziz section of the *central sector*'s surveyed areas, it can reasonably be assumed that those settlements which had established themselves around these would grow, reflecting their built-in advantage. Meanwhile, finding suitable locations for new settlements larger than a few hectares would have been difficult once the majority of watercourses and fertile basins were inhabited. Though the entirety of the waterfed regions would obviously not have been covered in urban conglomerations, they would be exploited for agricultural land that was likely strictly controlled by the large political centres. This may have been a variation on the system present at urban centres in the eastern Jazira, where according to agricultural texts from Tell Beydar communally-managed land was largely controlled by a handful of officials within the urban centre (Sallaberger & Ur 2004: 55-58). While a modicum of local management of land did occur at small villages, these were themselves subject to the authority of the "province" of Nabada (Tell Beydar), and likely never allowed to organically grow. In the GWJ the rigorousness of such control is likely to have been exacerbated by the scarcity of water. While independent individual hamlets could still sustain themselves along the remaining few unclaimed areas of land (see the large percentage of small settlements in the Jebel Abd al-Aziz area in Fig.5.10), these could never grow to medium-sized settlements. In the Sarugh, by contrast, the much higher rainfall (in parts higher than in even the *northern sector*) would have reduced the limitations on areas that supported sustainable settlement, explaining the relative prevalence of medium-sized sites in the 30-50% size distribution range.

The *northern sector* very possibly saw the existence of similar space-restrictive land tenure systems, as well as issues of water access due to low and uncertain fluctuating precipitation levels of only slightly lower urgency than that around the Jebel Abd al-Aziz (see Section 1.2.3). However, its abundance of both large watercourses and their medium-to-small tributaries meant that the options for establishing settlements both in immediate proximity to seasonal water and outside claimed agricultural territory were greater, leading to a low, but consistent spread of medium-sized sites in the frequency distribution (Fig. 5.10).

Similar results persist when the analysis of settled area is divided into one group of "villages" and one group of "small towns", "large towns", and "cities". The threshold between these two size categories was set at 5 ha for this analysis. This is based on the settlement cluster calculations of Kudlek (2006: 79-80), which defined this as the size boundary between second-order secondary sites (small towns), and tertiary sites (villages; see Section 2.1.4.7). The analysis shows that although the density of area occupied by settlements smaller than 5 ha are lower than that of large sites in both surveyed zones, they mostly follow the same basic pattern of dynamics over all periods (Fig. 5.7). In simple terms, a change in the density of towns and cities from one period to the next is generally complemented by a roughly proportional change in the density of villages. One notable exception to this general pattern within the study time period is the transition from the LC to the EBA, where in the *northern sector* the area of villages increases 25-fold, while that of larger settlements multiplies by seven. This is mainly a reflection of the occupation of the upper town of Tell Chuera during the LC and EBA, however as this was abandoned by the late LC, the figure for the larger settlements must be treated with caution. Conversely, the *central sector* sees the area of villages similarly increase by a factor of 25, but that of larger settlements expand a massive 41-fold. However, this is not representative of true settlement nucleation, as the low levels of settlement of *any* size in the LC make it more plausible that both smaller and larger settlements were established by migrants from elsewhere.

More precisely, in both the *northern* and *central sectors,* the amount of change in settled area from each period to the next, whether an increase or decrease, is often slightly greater in towns or cities than in villages; at least until the end of the EBA. This would suggest that towns and cities were marginally less stable in relation to villages. Once again, the criticality of access to water in the GWJ may be an explanation for this. As large settlements would have sustained larger populations, as well as larger tracts of agricultural land around them, they would have been more dependent on the reliability of available water sources than villages. This could have resulted in a lower resilience to the environment, producing more fluctuating settlement patterns. Meanwhile smaller settlements required less agricultural area to sustain their populations, and likely coped better with minor variations in water availability; furthermore probably engaging in low-risk agricultural practices due to their vulnerability (Lawrence 2012: 305-308). Regardless, the fluctuations of both settlement size types were consistently significant.

An in-depth look at the dynamics of the EBA alone reveals quite different patterns for the *northern* and *central sectors* (Fig. 5.8). The former zone shows at least three separate instances of significant growth in human occupation. The first is at the very start of the period, when the near-empty human landscape of the end of the LC gave way to the first examples of the EBA boom during EJZ 0; around 3100 BC (Meyer 2011: 129-130). The second major increase in settlement number density, of 43%, is at the start of EJZ 1 (ca. 2900 BC), which is when most of the EBA settlements in the eastern part of the *northern sector* were established.

Following this second period of growth, there is stability until a marked decline around EJZ 2 (ca. 2700 BC). This corresponds to the TCH IA/IB period, a time, according to Hempelmann (2013: 273-274), of environmental and economic crisis (see Section 2.1.4.7). In the Wadi Hamar area, several medium-sized settlements, which likely could not bear the losses of multiple subsequent years of poor crop, were abandoned, while the largest (Tells Chuera and Dakhliz) were restructured. Whether this event had an impact on the eastern part of the *northern sector* is hard to say, as the Yale Khabur Survey does not differentiate between EJZ 1 and EJZ 2. By a century later, the crisis seems to have been overcome (Hempelmann 2013: 274-275), as evidenced by the third major growth in settlement numbers, of 14%. Following this, the pattern appears to remain stable until a rapid decline at the start of EJZ 4b (ca. 2300 BC), when many sites, including relatively large ones such as the 23-hectare Tell Dakhliz, were abandoned. Such a process must have severely affected the major centre of Tell Chuera, which shows evidence for a significantly reduced occupation during the little-researched TCH IE period (EJZ 4b-c), when only its former inner mound was settled. This was clearly not a stable subsistence however, as by the end of the EJZ 4c, even this site was abandoned.

Recorded EBA periods in the *central sector* are, at best, limited to only two divisions: EJZ 1 to Final EJZ 2 and EJZ 3a-3b (see Section 2.3.4.3). Thus it is hard to discern any particular pattern; however the results present an overall picture of a more stable yet shorter-lived EBA settlement dynamic around the Jebel Abd al-Aziz. Since there exists no evidence for human occupation between LC 3 and EJZ 1, the only main visible growth in occupation takes place around 2900 BC, presumably for this zone the time of initial migration into and exploitation of the landscape. This density remains constant, with even a slight increase during EJZ 2 (the "crisis" phase for the Wadi Hamar region), until at least the end of EJZ 3b. At some point after this phase the majority of sites in the *central sector* were abandoned, though the exact timing of this is unclear. Tell Mabtuh Sharqi, the only excavated site in the region, shows evidence of continued occupation, and Kouchoukos (1998: 373) suspects several of the other large tells in the region to have been settled later also. Therefore the abandonment of settlement in this region could have occurred at any time between EJZ 4a and 4c, and was in fact perhaps a gradual process over this time. What is not visible in this data is the recorded collapse of small settlements at the end of Final EJZ 2 and the subsequent establishment of major centres, including many two-tiered fortified tells (*ibidem*: 410-412). This is because despite a major shift in dynamics, the number of large settlements established roughly equals the number of small settlements abandoned. Thus the limitations of data available for the region are illustrated here.

It appears that it can be said for certain, however, that the general abandonment of the GWJ began to affect the *northern* and *central sectors* within a short time of each other; though it seems the latter area saw it completed more rapidly. However, as these final phases of the EJZ chronology are not very well defined by material culture, and those definitions that do exist are not present in the GWJ (Section 2.3.4.1), it is hard to comment with any certainty on the rapidity of this process from the empirical data available. Circumstantial evidence from factors likely to have precipitated the collapse, including climatic variation and the increasing control of the Akkadian Empire, suggests a somewhat more gradual overall decline than the settlement data alone indicates; dynamics that are discussed in Chapter 6. This ties into the hypothesis that the abandonment of settlement in the steppe was a premeditated response to poor conditions rather than a true "collapse" (Section 5.4.2.2).

5.2.3. Early Bronze Age Settlement Systems

5.2.3.1. The EBA Archaeological Landscape

Though the focus of this thesis is both the LC and EBA, a wide-ranging analysis of the archaeological landscape can feasibly only be conducted for the latter period. This is partially due to the sheer low number of LC sites that could be included in such a discussion, but mainly as most existent LC sites in the GWJ are not uniquely representative of the period, with many being flat or even barely visible settlements. Those that are tells, meanwhile, only gained their distinctive morphology through continued post-LC occupation. Thus there is no clear signifier of LC settlement in the absence of ground truth data to match a mounded tell site's indication of EBA occupation (Lawrence *et al.* 2012: 354-355).

The results of this study show that the *northern sector* contains 141 sites that likely date to the EBA, constituting a relatively dense settlement distribution of on average 0.034 sites per km^2 (ca. one site per 30 km^2), extending across the Balikh from the Qaramukh to the Khabur (Fig. 5.11). Seventeen of these are two-tiered fortified tells, which are not, as has previously been believed, restricted to the Balikh-Khabur steppe (e.g. Meyer 2011), but extend further west also. These site types dominate the largest settled areas in the *northern sector*, representing 13 of the largest 17 EBA occupations; all over 16 ha in size (Tab. 5.1). In particular, the densely inhabited and massively fortified *true Kranzhügel* and *Dakhliz-variety* tells (which I consider to be "unfinished" *true Kranzhügel*; see Section 3.6.3.3), including many of the most prominent fortified settlements in the entire region, are located here. While east of the Balikh these are relatively well known (e.g. Tells Chuera, Abu Shakhat, and Khanzir), those west of the Balikh (Tells Barabra east and Marrak) have previously not been included in discussions regarding such settlements. Additionally, there is the overlarge Tell Chanafes, just east of the Khabur, which surely occupied a prominent place in the socio-economic landscape of not only the eastern section of the *northern sector*, but also the northwestern area of the Khabur valley basin as well as the area to the north, in modern-day Turkey.

There is a strong presence of *Matin-variety* sites across the western portion of the *northern sector*. Again, these have previously not been discussed together with other two-tiered fortified tells; however their large size (up to a maximum equivalent to that of Tell Chuera) and often very clear outer ramparts indicate settlements of equal importance to the EBA landscape of the GWJ. Indeed, even if one discounts the 141-hectare Tell Chanafes on the grounds of its location away from the interfluvial steppe, the existence of the 63-hectare Tell Matin removes the supposed prominence of the 68-hectare Tell Chuera, which

northern sector sites	central sector sites	southern sector sites	sizes (ha)
Site 31 (Tell Chanafes)			141
Site 22 (Tell Chuera)			68, possibly 80
Site 5 (Tell Matin)			63
	Site 36 (Tell Mabtuh Sharqi)		44
Site 27 (Tell Khanzir)			40
Site 210 (Tell Kufaifa)			34
		Site 46 (Khirbet Malhat)	33
Site 24 (Tell Abu Shakhat)			30
	Site 39 (Tell Mabtuh Gharbi)		28
Site 7 (Tell Barabra east)			26
Site 4 (Koberlik)			25
Site 72 (Tell Dakhliz)			23
Site 25 (Tell Bogha)			22
		Site 43 (Tell Sha'ir [Jazira])	21
Site 21 (Tell Ghajar al-Kebir)			20
Site 116 (Tell Glai'a)			18
Site 6 (Tell Marrak)			17
	Site 35 (Tell Hamam Sharqi)		16
	Site 2 (Tell Sha'ir [Sarugh])		15
	Site 41 (Tell Mu'azzar)		14
	Site 38 (Tell al-Magher)		13
		Site 44 (Tell Zahamak)	10, possibly 50
		Site 45	8.6
Site 8			8.5
	Site 37		7.3
	Site 42		6.1
Site 19			5.2
Site 959			5.2
	Site 408		4.6
	Site 34		4.5
	Site 991		4.3
Site 818			4
	Site 487 (Tell Mityaha)		2.6
	Site 1065 (Tell Jerwa)		1.3, possibly 35
	Site 445		1, possibly 8

= true Kranzhügel
= ringwall settlements
= Dakhliz-variety tells
= Matin-variety tells
= other two-tiered fortified tells

Table 5.1: Complete list of the two-tiered fortified tells located in each settlement sector.

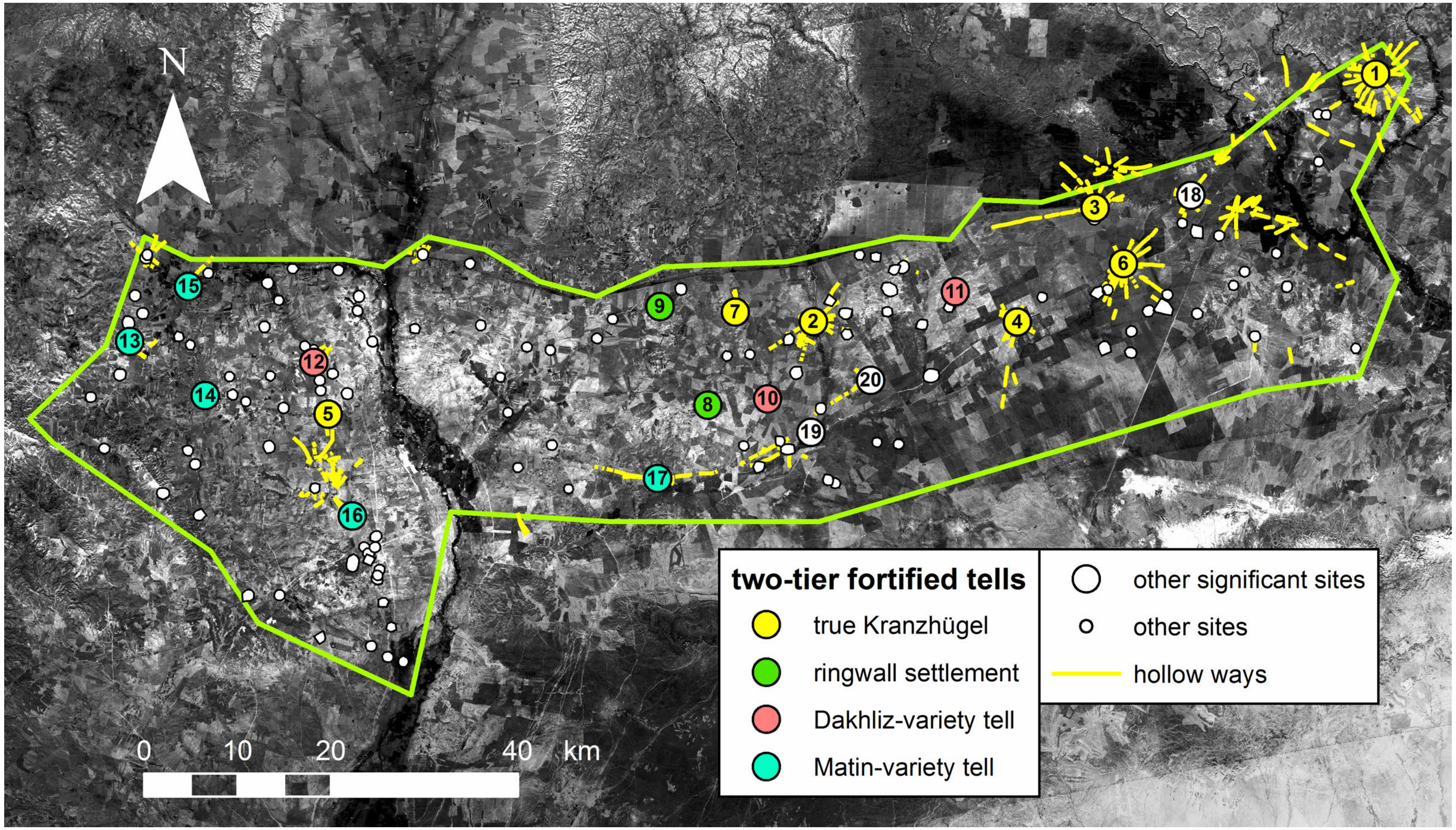


Figure 5.11: CORONA satellite image of the *northern sector* showing all likely EBA features.
True Kranzhügel: 1 - Tell Chanafes, 2 - Tell Chuera, 3 - Tell Khanzir, 4 - Tell Abu Shakhat, 5 - Tell Barabra east, 6 - Tell Bogha, 7 - Tell Ghajar al-Kebir. *Ringwall settlements*: 8 - Site 19, 9 - Site 818. *Dakhliz-variety* tells: 10 - Tell Dakhliz, 11 - Tell Glai'a, 12 - Tell Marrak. *Matin-variety* tells: 13 - Tell Matin, 14 - Tell Kufaifa, 15 - Koberlik, 16 - Site 8, 17 - Site 959. Other significant sites: 18 - Tell Kharab 'Arnan, 19 - Tell Tawila, 20 - Tell Kharab Sayyar.

previously appeared to be nearly twice the size of the second-largest settlement in the area (e.g. Meyer 2010a: 11-14, 24). Thus it remains clear that two-tiered fortified tell sites likely dominated the political and economic landscape, as well as the geographical one, of the 3rd millennium BC. With the density of settlement in the Balikh-Qaramukh region equal to, if not greater than that around the Wadi Hamar, and evidence for the same set of site types in both areas, it is questionable whether the Balikh was any great "border" in the socio-political makeup of the northern GWJ during the 3rd millennium BC. Rather, it appears that such boundaries, where existent, were determined more by the availability of water sources and methods of sustainability than by delineated geographical features.

EBA sites in the *central sector* were found to be overrepresented when compared to sites from all time periods; at 0.009 sites per km^2 (ca. one site per 110 km^2) their density is a quarter of 3rd millennium settlement in the *northern sector* (Fig. 5.12; compare Section 5.2.1.2). This distribution is mostly even, save for areas of major upland. This is not the case for two-tiered fortified tells, however. Although the 14 representations of these dominate all large EBA settlements in this zone, with six out of the seven sites of over 12 ha represented, the remaining eight range in size down to 1 ha (Tab. 5.1). Furthermore, the majority are clustered around the Jebel Abd al-Aziz. These are for the most part well-documented *true Kranzhügel* and *ringwall settlements*, though certain sites like Tell Hamam Sharqi have previously not been considered two-tiered fortified sites. The vicinity of this *jebel* is also where the largest sites of the *central sector* are located, most prominently the 44-hectare *true Kranzhügel* Tell Mabtuh Sharqi. It is significant, however, that the majority (around three quarters) of two-tiered fortified tells in this area are the presumably less-densely inhabited *ringwall settlements*, whose "lower towns", if not completely empty, certainly do not show evidence of many permanent structures. Along with the obvious lower regional settlement density, this is the most significant departure of the EBA Jebel Abd al-Aziz region from the *northern sector*, and a further signifier of a sparser network of human activity.

The remainder of the *central sector* is punctuated by few and often unusual manifestations of major settlements. By far the largest, and most easily ascribable to a clear site type, is the 14-hectare Tell Sha'ir [Sarugh], a *Dakhliz-variety* site previously not included in discussions of two-tiered fortified tells. The remainder are mostly small, the most notable of which are the fortified microsites of Tell Jerwa and Site 445, newly discovered (or at least, rediscovered) by this study. This lack of uniformity and small size of sites, with fortified ones few and far between, indicates very different socio-political, and likely economic, processes at work here compared with those of at least the northern

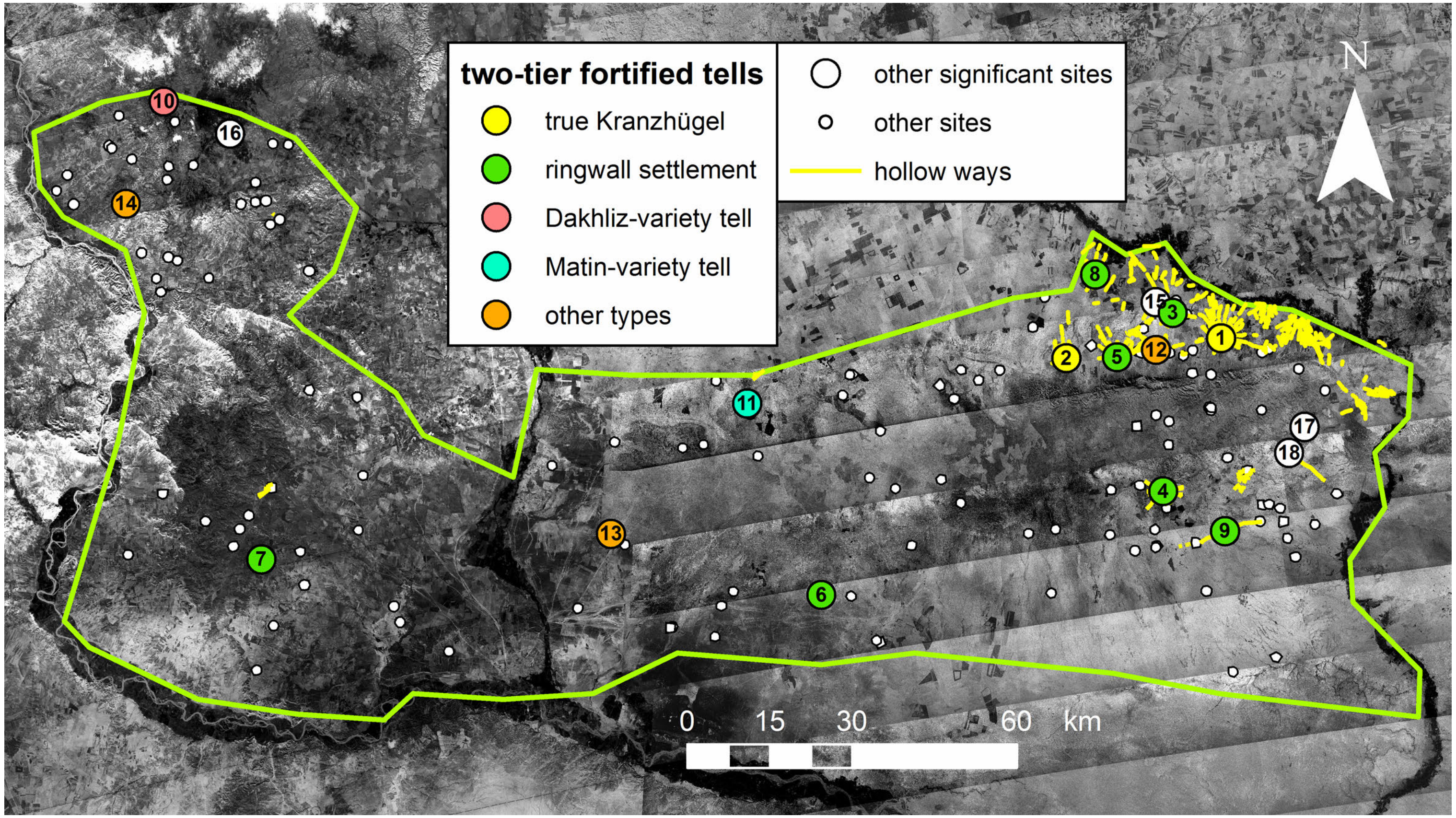


Figure 5.12: CORONA satellite image of the *central sector* showing all likely EBA features.
True Kranzhügel: 1 - Tell Mabtuh Sharqi, 2 - Tell Mabtuh Gharbi. *Ringwall settlements*: 3 - Tell Hamam Sharqi, 4 - Tell Mu'azzar, 5 - Tell al-Magher, 6 - Site 42, 7 - Site 408, 8 - Site 34, 9 - Tell Mityaha. *Dakhliz-variety* tells: 10 - Tell Sha'ir [Sarugh]. *Matin-variety* tells: 11 - Site 991. Other two-tiered fortified tells: 12 - Site 37, 13 - Tell Jerwa, 14 - Site 445. Other significant sites: 15 - Tell Hamam Gharbi, 16 - Tell Hajib, 17 - Tell Makhrum, 18 - Tell Mabtu'a.

part of the Jebel Abd al-Aziz region, let alone other settlement sectors. However, as with the *northern sector*, the Balikh does not appear to have been a great boundary during the EBA; at least its presence does not affect the archaeological landscape apparent on both sides of the river. Overall, in contrast to the *northern sector*, past interpretations of the *central sector* have not been inaccurate, merely incomplete, as this region features a truly more heterogeneous EBA landscape.

The 3rd millennium archaeological landscape of the *southern sector* is very different from either of the other two settlement sectors. At under 0.002 sites per km^2 (ca. one site per 500 km^2), a density under a fifth of that of the *central sector*, EBA settlement is severely underrepresented (compare Section 5.2.1.3). However, that fact alone does not paint an accurate picture, as more importantly all sites are clustered within the northernmost 10 km of the zone (Fig. 5.13). This is likely at least partially due to the restrictions of remote sensing-based data collection; as clear tell sites visible on satellite imagery are the only feasible indicator for likely EBA settlement, and as these generally do not occur in arid regions, possible 3rd millennium occupation at flat sites further south cannot be ruled out (see below). However, it is nevertheless significant that 11 tell sites, up to 30 ha, possibly even 50 ha in size, exist in this arid region at all. Two-tiered fortified sites significantly dominate these in terms of size, representing the four largest settlements (all above 8.6 ha; Tab. 5.1), while all ordinary tells measure under 1 ha. Only one, however, is clearly definable; the *ringwall settlement* Khirbet Malhat, while the others are unique fortified sites. None appear densely occupied, with each featuring a “lower town”, or at least surrounding area, of low-intensity human activity and negligible structural remains. These factors lead to the hypothesis that the EBA dynamics of the *southern sector* are very different from those of the other two settlement sectors, with two-tiered fortified sites possessing a unique role, likely unrelated to other habitations.

By comparison with similar sites in other regions of roughly equal climate, it is possible to ascribe further sites in the *southern sector* to the EBA. Specifically, five sites that strongly resemble the morphology of Jawa and other settlements in the Jordanian Badia (most notably Khirbet Abu al-Hussein; discussed in Section 4.5.4) can by association be tentatively dated to the LC and/or early EBA, in line with evidence from ground truth investigations carried out by the Jawa Hinterland Project (Müller-Neuhof 2014a, 2014b; see Section 5.4.1.2). This increases the potential spread of EBA human activity to include areas well south of the 200 mm isohyet, though never more than 20 km from the nearest river. These potentially seasonal, or semi-seasonal, sites, possibly used for habitation but mainly associated with the corralling of animal herds, indicate that a pastoral

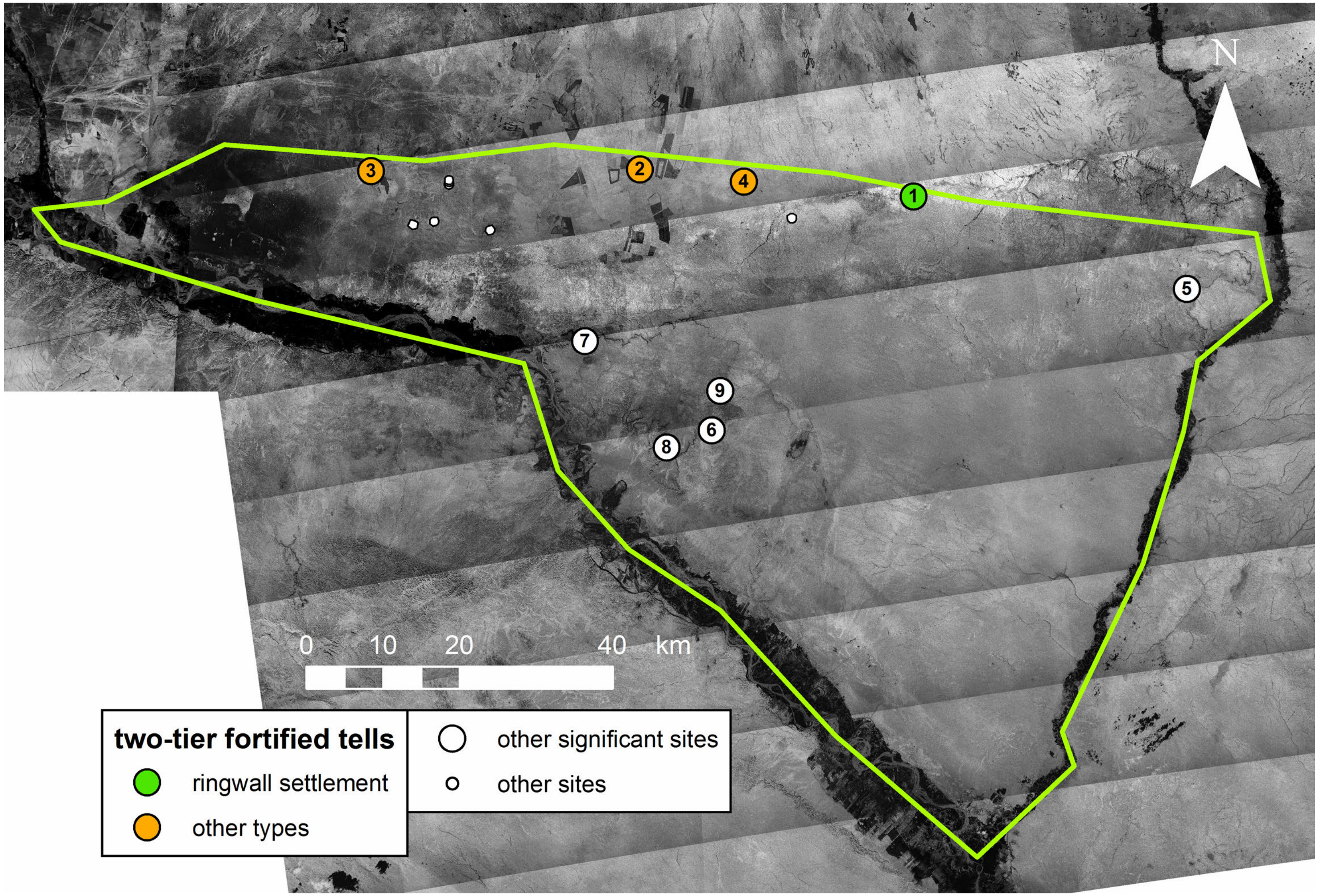


Figure 5.13: CORONA satellite image of the *southern sector* showing all likely and potential EBA features. *Ringwall settlements*: 1 - Khirbet Malhat. Other two-tiered fortified tells: 2 - Tell Zahamak, 3 - Tell Sha'ir [Jazira], 4 - Site 45. Other significant sites: 5-9 - sites resembling Jawa (Jordanian Badia).

economy was likely important to EBA populations in the *southern sector*, and further separates the general socio-economic dynamics of this region from that of its four two-tiered fortified tells. The potential Bronze Age (maybe EBA) burial mounds of the region are further evidence of this, as their closest analogies in the Jebel Bishri are associated with transhumant populations (Fujii & Adachi 2010). However, another explanation may be that these constitute small necropoleis used by settlements situated along the Euphrates, which are known to sometimes be located a considerable distance from the river.

Though it may not be said that hollow ways only exist around large political centres, it may be said that the majority of such centres exhibit hollow way systems. Their presence seems to be based on a combination of location, site morphology, and settlement size. To begin with, all hollow way systems in the GWJ are located north of the 250 mm isohyet (see Fig. 4.22). In this region, when present around two-tiered fortified tells, they are mostly restricted to either *true Kranzhügel* or *ringwall settlements* over 10 ha in size. *Matin-variety* tells feature only a handful of isolated routeways, while none at all exist around those of the *Dakhliz variety*. Some of the larger ordinary tells such as Tells Kharab ‘Arnan and Hamam Gharbi feature large route networks too. These factors are supportive of the theory of an economy in the *northern sector* and majority of the *central sector* based on agro-pastoralism (see Section 5.2.4.2), as the long-term large political centres (“states”) such as Tell Chuera would have controlled much of the agricultural land around them and pastureland beyond that, which in turn led to the forming of restricted routeways archaeologically manifested as hollow ways (see Sallaberger & Ur 2004: 62). Further south, the lack of hollow ways could be the result of a different political structure; however the similarities in the morphologies of several of the *ringwall settlements* north and south of the Jebel Abd al-Aziz renders this hypothesis unlikely. More probably, the soil structure of the wetter areas aids in the preservation of the features, whereas in the arid, dusty environment of the south they disappeared.

The extremely sparse evidence for canals and qanats in the GWJ precludes the recognition of any patterns in their distribution. All that can be said is that they are universally located in either the *northern* or *central sectors*, and all near seasonal wadis (see Fig. 4.22). This is not surprising considering the access to watercourses required to provide sufficient flow to be able to benefit from the construction of such features. However, as the existence of more canals than are visible on remote sensing has been proven around Tell Chuera (Meyer 2010d: 209-210), it is not unreasonable to assume the same could be the case elsewhere in the GWJ; for qanats also. Furthermore, the discovery of canals along the lower Middle Euphrates (particularly around Mari) and Khabur, tentatively dated to the EBA, confirms that the technology to construct such features not only existed at the time, but was also not limited to single societies (Monchambert & Geyer 2011).

5.2.3.2. Rank-Size Rule Calculations

Several detailed calculations of settlement clusters, potential agricultural area available, and hinterland spread were carried out for settlements in the Wadi Hamar Survey by Kudlek (2006: 103-111). These divided the identified sites into hierarchical size ranks using a cartographic interpretation based on their distribution, and subsequently applied Thiessen polygons to the highest-ranked sites to determine the ranges of their provincial hinterlands. Such "first order sites" comprised Tells Chuera, Abu Shakhat, and Dakhliz. The results of these calculations were then interpreted based largely on Felix Auerbach's "rank-size rule" as interpreted by Reinhard Bernbeck (1997: 175-179). This states that the ideal size ranking of a developed capitalist-economy society is for the second-largest site to be half the size of the largest, the third-largest a third of the size, and so on. Applying this model to the Wadi Hamar Survey, Kudlek notes that the size ranking appears to be primoconvex[81], deviating off Bernbeck's "ideal" such that the second-largest site is 10% smaller than expected (Fig. 5.14). According to Bernbeck (1997: 177), this primoconvex pattern is typical of settlement systems with a newly-established elite which micromanages the important sections of regional administration. Thus medium-sized settlements suffer, while small ones remain largely unaffected by this control. Certainly such an interpretation of the society of the Wadi Hamar area, and indeed the entire *northern sector*, chimes in with archaeological evidence (Meyer 2010a: 26-28, 2010d: 210).

By following the hypothesis that Tell Chuera controlled a "state" covering the majority of the *northern sector* (see Section 2.1.3.1; also Chapter 6), the models used by Kudlek can be accurately applied to a larger number of EBA settlements in the Wadi Hamar Survey, as well as the Balikh-Qaramukh plains, within a single settlement system. Doing so leads to a different picture from that discussed above. In the pattern produced both east and west of the Balikh during this time, settlements above the size of 1.4 ha are larger than "expected" in the rank-size ruling. Due to data recovery bias issues however, the possibility that both the Wadi Hamar Survey and the *Westjazira* Survey, neither of which made use of remote sensing, failed to identify a significant number of small sites must be taken into consideration. Thus settlements under a hectare in size have been discounted from this

[81] Also known as a primate distribution, see Smith (1990: 33-39).

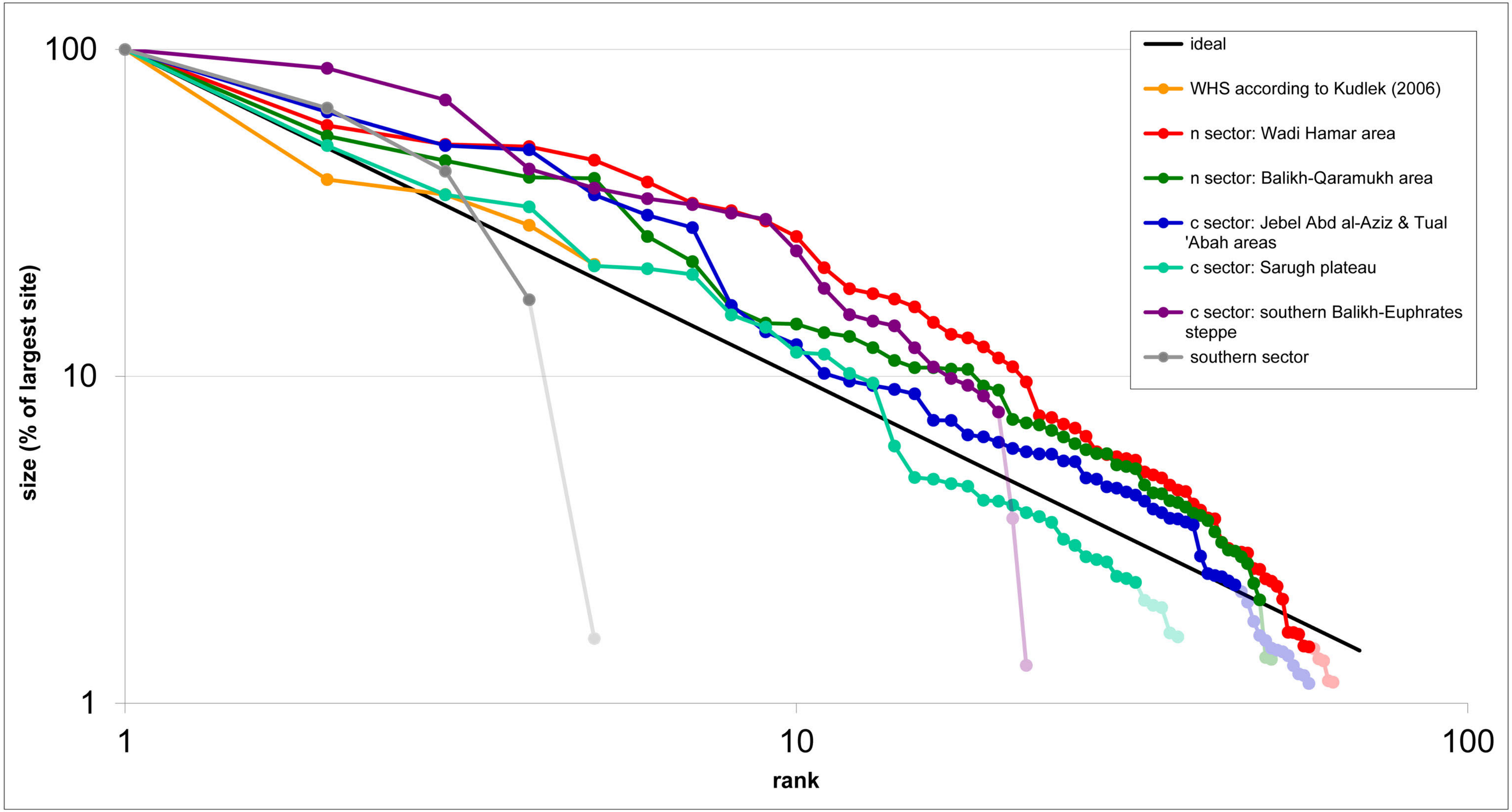


Figure 5.14: Rank-size rulings for definite and probable EBA settlements in various geographical regions of the GWJ. Faded-out line sections indicate sites below 1 ha in size, which in order to minimise data recovery bias were not included in the analysis.

analysis, resulting in the pattern being a convex curve above the "ideal" line (Fig. 5.14). According to Bernbeck (1997: 176-177), this applies to systems where each settlement cluster (of main towns and dependent villages in its hinterland) is fairly self-contained, having enough agricultural or pastoral land to be relatively economically independent, with little reliance on tribute or economic ties between large political centres; in other words a low system integration of local control (Johnson 1980: 234-237). Although this may seem to go against the archaeological interpretations of Tell Chuera as a strong regional polity, it makes sense of the relative paucity of small settlements in large settlements' hinterlands, and the lack of availability of tribute this indicates (see Section 5.2.3.4; also Sections 5.2.4.2, 5.4.2.2).

Conducting rank-size analyses on areas south of the *northern sector* is more problematic, as over the course of the EBA the region was doubtless under the control of several political and economic systems, or one system which shifted over time (see Chapter 6). In the absence of much detailed chronological data, these variations are hard to separate however. Thus the inclusion of all sites with EBA occupation into a single dataset would almost certainly provide erroneous results. This can be somewhat mitigated by dividing the *central* and *southern sectors* into areas based on settlement densities and physical barriers such as the Balikh, but remains an issue. Thus the below interpretations should be considered provisory.

A convex curve is produced by the ranked sizes of probable EBA settlements located in three individual areas of the *central sector*: the mountainous areas of the Jebel Abd al-Aziz and Tual 'Abah, the Sarugh plain, and the southern Euphrates-Balikh steppe. These follow the same pattern as the regions of the *northern sector*; though the latter drops off very steeply as it crosses the line of "ideal" rank size, this only occurs at site sizes lower than 1 ha, which are outside the reliable dataset for such an analysis (Fig. 5.14). A far more drastic iteration of this pattern, within the reliable dataset boundary, is found in the size rankings of EBA sites in the *southern sector*. Such a curve shape indicates that there is a relative size gap between larger sites (cities and large towns) and small sites (villages), with little in the way of small towns. In this sector, this refers to the ranges of around 1 to 8 ha. A settlement size dynamic of this sort implies a system where cities, supported by large towns in their hinterlands, jointly dominated the local economies, keeping close control thereof. This co-working of primary and secondary sites would have precluded the establishment of small towns, leaving only villages and hamlets able to subsist in such a socio-economic system.

5.2.3.3. Grain Surplus/Deficit Calculations

site cluster	Tell Chuera	Tell Abu Shakhat	Tell Dakhliz
available arable land (ha)	17,225	5,509	7,293
land for fallow (ha) at 10%	1,723	551	729
crop-growing land available (ha)	15,503	4,958	6,564
settled area (ha)	145	34	26
inhabitants at 150 persons/ha	21,750	5,100	3,900
needed annual grain (kg) at 220 kg/person	4,785,000	1,122,000	858,000
actual annual yield (kg) at 600 kg/ha	9,301,500	2,974,860	3,938,220
yield used for seed (kg) at 30%	2,790,450	892,458	1,181,466
annual yield usable by population (kg)	6,511,050	2,082,402	2,756,754
surplus	**36%**	**86%**	**221%**

Table 5.2: Calculations of annual grain requirements and yields for selected sites in the *northern sector* adapted from Kudlek (2006: 108-109).

Kudlek (2006: 103-111) further used Thiessen polygon calculations to estimate land control and grain production across the agricultural areas around three major settlement clusters in the *northern sector* – those of Tells Chuera, Abu Shakhat, and Dakhliz. This was conducted based on the assumption of a maximum agricultural radius of 5 km around the small settlements in the large ones' hinterlands[82]. With an estimated population density of 150 persons per hectare, a grain allowance of 220 kg per person per year, a yield of 600 kg per hectare per year, 10% of land for fallow, and 30% of yield used for seed, results indicated that the totals of these three clusters included a significant overabundance of cultivatable area. Kudlek's calculations suggest this would have produced a grain surplus of varying amounts at all three investigated sites (Tab. 5.2).

Meanwhile Kouchoukos (1998: 387-393) makes the same calculations for five EBA sites (two of them major two-tiered fortified tells) in the *central sector* – four around the

[82] According to Bernbeck (1997: 163-164), beyond a radius of 5 km, the time taken for travel to the outermost fields would start to severely affect the productivity of farmers, a consideration also put forward by Wilkinson (1997). This figure was first suggested by Vita-Finzi and Higgs (1970: 16), who developed it from ideas put forward by Chisholm (1962).

site cluster	Tell Mabtuh Gharbi	Tell Mu'azzar	Tells Mabtu'a and Makhrum	Tell Sha'ir [Jazira]
available arable land (ha)	2100	3100	1100	800
land for fallow (ha) at 50% (biennial fallowing)	1050	1550	550	400
crop-growing land available (ha)	1050	1550	550	400
settled area (ha)	28	14	5.2	21
inhabitants at 100 persons/ha	2800	1400	520	2100
needed annual grain (kg) at 300 kg/person	840000	420000	156000	630000
actual annual yield (kg) at 600 kg/ha	630000	930000	330000	240000
yield used for seed (kg) at 15%	94500	139500	49500	36000
yield lost during storage (kg) at 22.5% (20-25% average)	21262.5	31387.5	11137.5	8100
annual yield usable by population (kg)	514237.5	759112.5	269362.5	195900
surplus	**-39%**	**81%**	**73%**	**-69%**

Table 5.3: Calculations of annual grain requirements and yields for selected sites in the *central sector* adapted from Kouchoukos (1998: 391-392).

Jebel Abd al-Aziz and Tell Sha'ir [Jazira] to the southwest. Areas of sustaining agriculture around each of these was calculated from multispectral Landsat satellite imagery; measurements that were feasible specifically due to the restriction of site locations to individual pockets of cultivatable land (see Section 5.2.1.2). Kouchoukos uses somewhat different input values from Kudlek, estimating a population density of 100 persons/ha (which is admittedly "certainly low" [*ibidem*: 391]), an annual grain allowance of 300 kg/person, an annual yield of 600 kg, 15% of yield used for seed, and a further 20-25% loss of crop during storage. Additionally, Kouchoukos assumes biennial fallowing was practiced, which halves the available cultivatable land in any given year (Section 1.3.2). These values applied to calculations of sites in the *central sector* show that some of the larger two-tiered fortified tells, including the 28-hectare Tell Mabtuh Gharbi, do not have sufficient sustaining hinterlands to support them, let alone have any surplus (Tab. 5.3). However, this is not the case with Tell Mu'azzar, or the joint cluster of Tells Mabtu'a and Makhrum, despite these being in regions with lower precipitation.

Applying such calculations across a larger number of settlements in the GWJ is unfortunately not possible. Firstly, sustaining areas around sites can only be accurately determined by satellite imagery provided they form individual pockets of cultivatable areas, as around the Jebel Abd al-Aziz but not elsewhere. Secondly, with the absence of much ground truth data too little is known of carrying capacities of the soils in the region. However, the calculations already carried out can be critically evaluated, and differing input values from other sources can be applied to the sites involved. To start with, comparing the results of surplus calculations for these sites based on the input values of Kudlek and Kouchoukos, respectively, provides variant results (Tab. 5.4). According to figures put forward by the former author, only Tells Mabtuh Gharbi and Sha'ir [Jazira] do not have sufficient agricultural land to sustain their expected populations, while three of the site clusters (Tells Dakhliz, Mu'azzar, and Mabtu'a/Makhrum) could produce over twice the amount required by their inhabitants. Kouchoukos' figures paint a more restrained picture, with only Tell Dakhliz producing more than twice its requirement, and Tell Chuera being almost precisely self-sufficient with no surplus. The overall pattern of which sites produced surplus and which would have required additional stocks remains largely the same, however.

More detailed and more thoroughly explained input values for the above calculations can be obtained from Wilkinson (1994: 495-499)[83]. With estimations of 100 persons/ha population density and 250 kg/person annual grain requirement, Wilkinson also works on the hypothetical basis of a 5 km radius of agricultural land being the maximum before the labour and grain-loss costs of transport becomes unfavourable. He additionally uses the same biennial fallowing model as does Kouchoukos. While this practice was favourable in areas of rain-fed cultivation, in more marginal regions it likely became essential, as it increases resilience to poor crop years, helping communities balance out the fluctuating precipitation levels (Smith & Wilkinson in press). With this in mind, Wilkinson calculates surplus and deficit productions at yields of 300, 400, 600, and 800 kg/ha, representing less to more favourable production years dependent on variable water sources. Unlike the calculations of Kudlek and Kouchoukos, this takes into account seasonal fluctuations in precipitation and subsequent watercourse capacity. Assuming that the rate of these fluctuations remained fairly constant, the average of 300 to 800 kg/ha yields (i.e. 550 kg/ha) was used to calculate the surplus and deficit figures in Table 5.4. These are somewhere in between the two sets of values obtained by Kudlek and Kouchoukos, but close to the latter. The overall pattern remains the same, however: only two sites of the seven under investigation show a deficit, with the rest either breaking even (in the case of Tell Chuera), or producing a sizeable surplus of between 37% and 138%.

This is admittedly a very small sample size when compared to the ca. 300 likely EBA settlements across the GWJ. Nevertheless, they are representative of all three of the

[83] For a recent dissemination of the model and values proposed by Wilkinson (1994), see Kalayci (2013: 32-45).

site cluster	settled area (ha)	available cultivatable land (ha)	surplus		
			Kudlek 2006	Kouchoukos 1998	Wilkinson 1994
Tell Chuera	145	17,225	36%	-3%	1%
Tell Abu Shakhat	34	5,509	86%	32%	37%
Tell Dakhliz	26	7,293	221%	129%	138%
Tell Mabtuh Gharbi	28	2,100	-14%	-39%	-36%
Tell Mu'azzar	14	3,100	154%	81%	88%
Tells Mabtu'a and Makhrum	5.2	1,100	142%	73%	79%
Tell Sha'ir [Jazira]	21	800	-56%	-69%	-68%

Table 5.4: Comparative calculations of surpluses or deficits in annual grain yields for selected sites (simplified from Kouchoukos 1998; Kudlek 2006; Wilkinson 1994).

defined settlement sectors, as well as the three main geographical area types: flat watered plains, mountainous uplands, and arid steppe. Thus at least a modicum of analysis can be conducted on this data. Kouchoukos (1998: 387-393) argues that the at times fairly extensive hollow ways emanating from two-tiered fortified tells precludes the possibility that they had a low density of population and were largely used as walled sheep folds, as proposed by van Liere and Lauffray (1955; see also Section 2.2.1). Sticking with an estimate of at least 100 persons/ha, and citing low numbers of smaller potential supporting settlements in the vicinities of large centres (see next section), Kouchoukos (1998: 393) concludes that "the most likely explanation is that pastoral products – meat and milk – supplied a significant part of the nutritional needs" of sites with an apparent grain deficit. While Kouchoukos is right to recognise that there is a need to explain the sustainability of settlements in the more marginal areas of the GWJ (predominantly the southern half of the *central sector* and the entire *southern sector*), such a conclusion is indicative of the erroneous assumption of homogeneity of two-tiered fortified tells, as the evidence for high-density populations in *true Kranzhügel* of the *northern sector* is being used to interpret the economies of mostly *ringwall settlements* in the *central* and *southern sectors*. In fact, the population densities of the latter are far from clear, with both the "empty" look of their lower towns on satellite imagery and ground truth data from Tell Beydar suggesting they may have seen less habitation per hectare than their *northern sector* counterparts (see Bretschneider 2005; discussed fully in Section 5.3.4). While the suggestion of pastoralism having played a part in the economies of these settlements should not be discounted, it is likely that a reduced population density alleviated the need for high grain production. Conversely, a discussion of pastoralism should not be exclusively reserved for sites in the more marginal regions either, but rather seen as a factor of both varying and fluctuating importance, dependent on the erratic nature of precipitation in the GWJ.

5.2.3.4. Large Settlements and their Hinterlands

A further factor in possible explanations for the subsistence of sites in the GWJ is the relationship between large settlements and the potentially supporting "villages" in their hinterlands. In such a model, excess grain and livestock produced by small settlements in their own surrounding hinterlands would have been given to regional centres in the form of tax or tribute, providing the latter with a bonus during favourable years. This bonus would have become an essential supplement during low-yield seasons, however, allowing major settlements to draw resources from a larger area than they directly controlled or than their

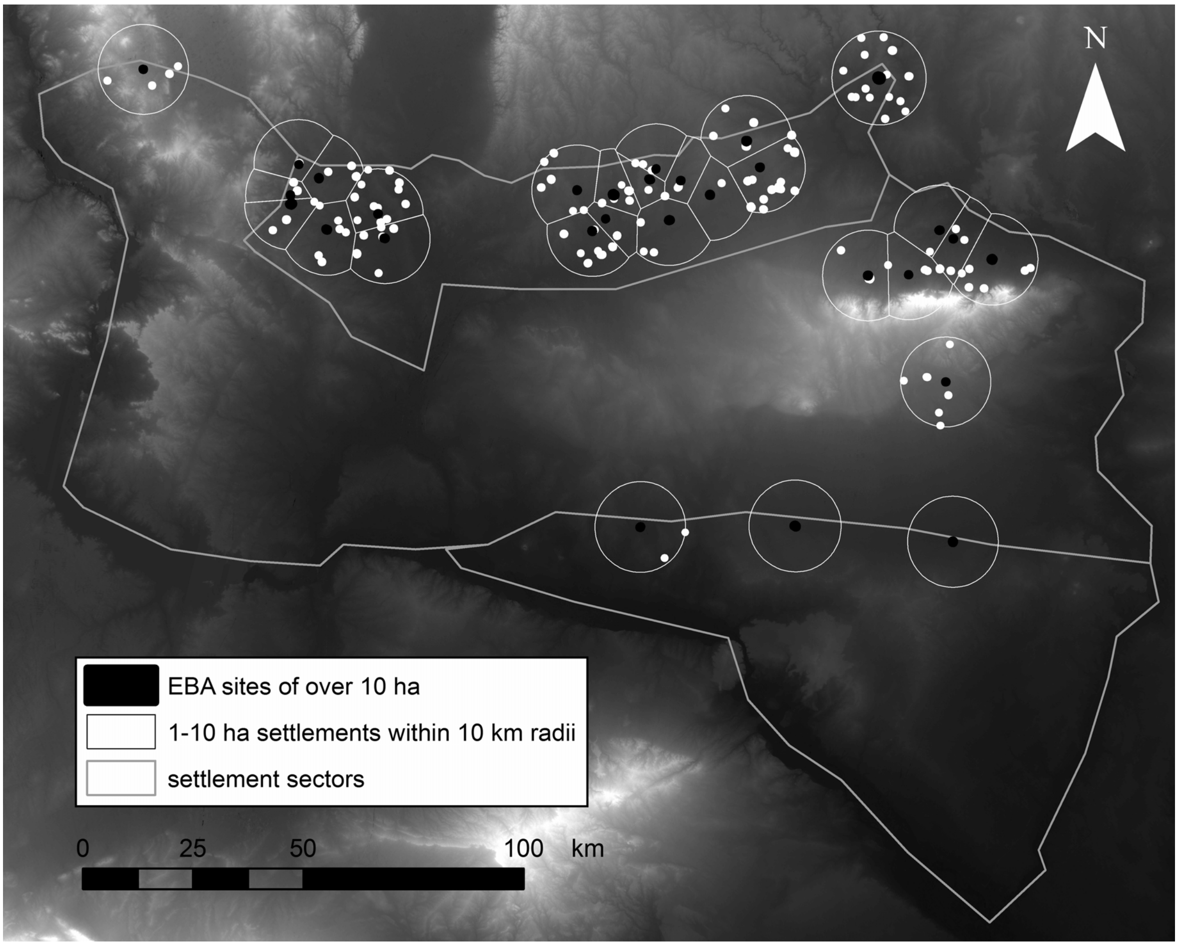


Figure 5.15: ASTER map showing major settlements and their 10 km radii (where applicable, with Thiessen-polygon buffers), with minor settlements within these.

population could manage on their own (Smith & Wilkinson in press). This system has specifically been suggested for the Khabur basin (e.g. Meyer 2010a: 22) and analysed by Kalayci (2013: 242) at Tell Brak, for which he estimated between seven and 27 supporting settlements were required, depending on the site's population density. As textual evidence suggests 17 settlements existed in Tell Brak's hinterland (the "Kingdom of Nagar", which included Tell Beydar [Nabada]), Kalayci considers the site to have had sufficient support from its immediate surroundings to have been able to deal with significant periods of low yield.

With regard to GWJ, Kouchoukos (1998:391-393) touches on the issue, stating that "small villages [are] relatively scarce in the West Jazirah", but does not elaborate or provide data. Similarly, Kudlek (2006: 103-110) discusses the relationship between large and small settlements, but in the framework of rank sizes and political hierarchies rather than economic systems. Fortuitously, however, such an analysis can be carried out by remote sensing data alone as long as the study is restricted to a purely quantitative standpoint, from which socio-economic factors can be extrapolated. Again using Kudlek's (2006: 79-80) settlement size divisions as in Section 5.2.2.2, the 10 ha threshold is used as the boundary between secondary sites (large towns) and tertiary sites (small towns), while the radius of their hinterland is placed at 10km. This latter value allows for an immediate radius occupied by agriculture (see above) as well as pastureland beyond that – a site's "exploitation territory" (Vita-Finzi & Higgs 1970: 6-8) – while still encompassing enough area for potential satellite settlements. Where large settlements are close enough to each other that these hinterlands overlap, radius-limited Thiessen polygons have been calculated to delineate their boundaries (Fig. 5.15).

The data collected on the size of EBA cities or large towns and the number of small towns or villages with EBA occupation in their vicinities shows a lack of any clear correlation. As can be seen in Figure 5.16, there is no indication that larger settlements feature greater numbers of supporting settlements in their hinterlands; indeed it is sites around the 20 ha size in the *northern sector* that exhibit the largest numbers (up to 12). The majority of major sites, between 10 and 40 ha in size, feature between zero and six satellite settlements. If there is an overall pattern to be had, it is simply one of very low numbers of potential supporting settlements, both true in absolute terms, but especially when one considers the large sizes of the major centres of the GWJ, nearly half of which measure over 25 ha. This is emphasised if one compares this with data from surrounding regions, which suggest a correlation between large site size and numbers of satellite settlements, which provided both human labour and material goods support (Lawrence & Wilkinson 2015: 339-342; Smith & Wilkinson in press).

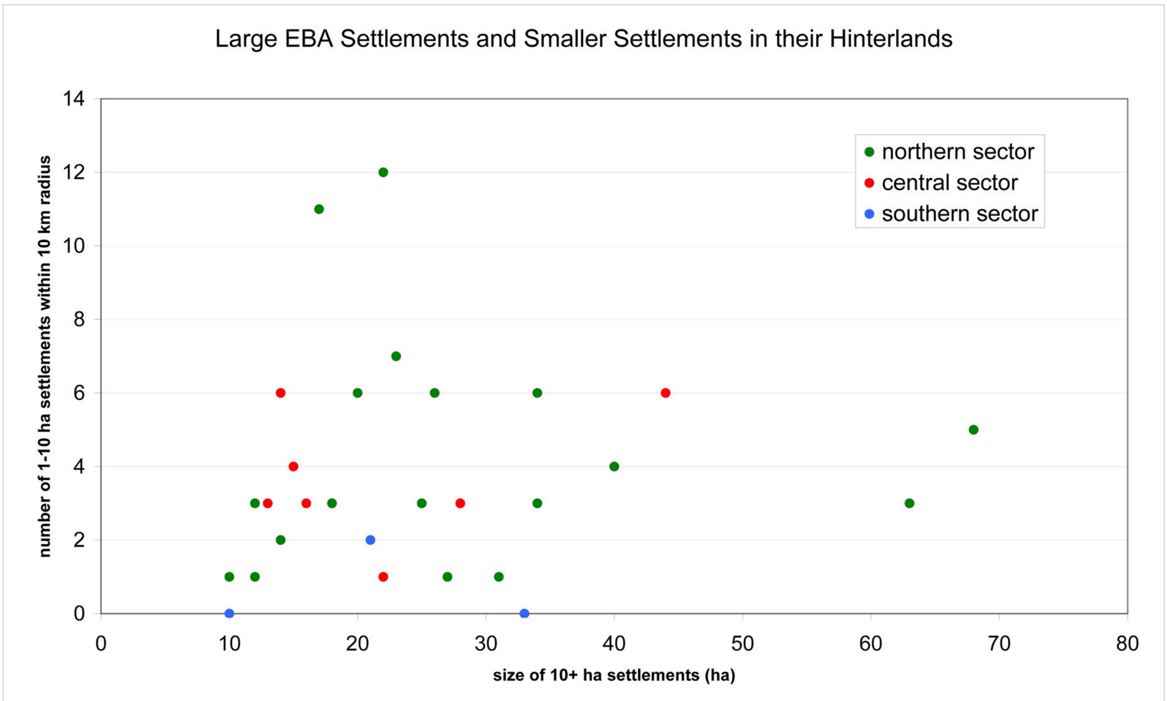


Figure 5.16: Graph of the sizes of large EBA settlements in the three *zones* of the GWJ and the numbers of potential supporting settlements in their 10 km-radius hinterlands.

More definitive patterns can be obtained by analysing the locations of the major settlements in question, rather than their size. This is best illustrated by calculating a ratio of satellite settlement numbers over major site size; the higher the ratio, the more directly proportional the settlement size vs. supporting settlements relationship. Though again no clear linear correlation is discernible, it is evident that the maximum value of this ratio decreases in settlement sectors with on average lower precipitation (Fig. 5.17). Thus it seems that the number of smaller settlements within 10 km of larger ones does not vary from the general site distribution density in each of the three *sectors*.

Overall, the results of this analysis support Kouchoukos' assertions that supplemental support by local small towns and villages could not have been a major component of the economies of large EBA settlements in the GWJ. Not only is the overall number of small sites low, but there especially is no sign that the largest sites had anywhere near the numbers of supporting settlements needed. Additionally, the lower ratios of small settlements relative to major sites' sizes in areas of lower precipitation, where the need for support systems is greater, further corroborates this hypothesis. Thus while potentially providing a bonus to local and regional centres during years of high or average precipitation, the few small towns and villages would not have produced sufficient reliable surplus grain to account for the subsistence of large settlements in times of low water availability.

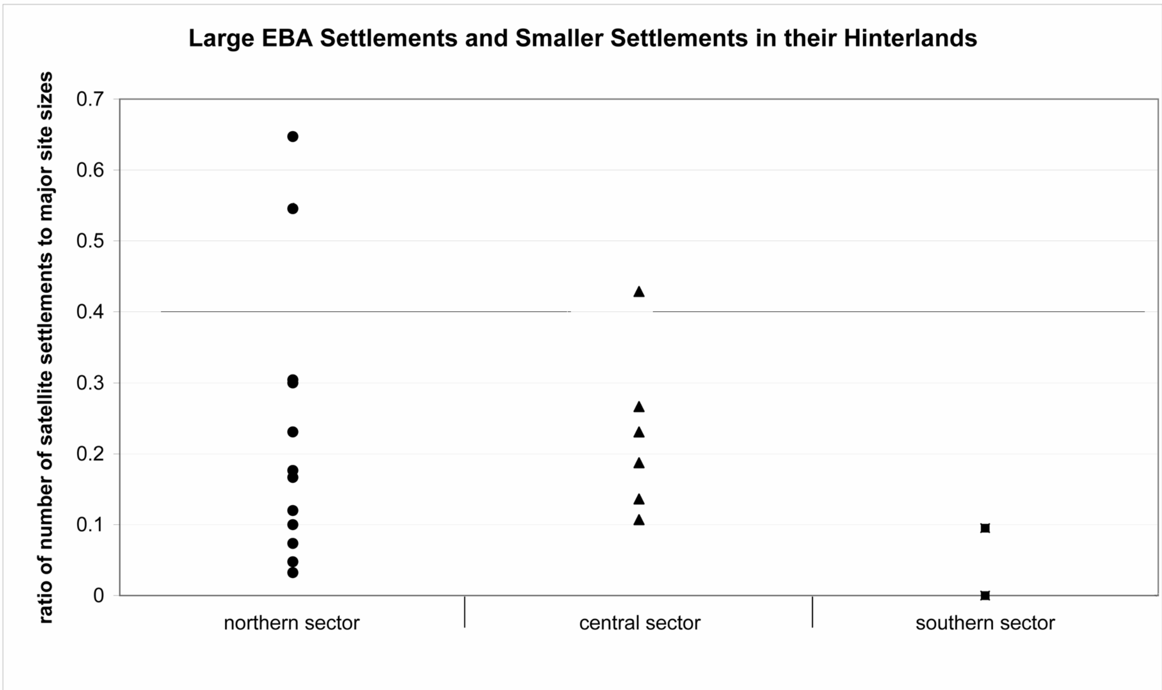


Figure 5.17: Graph of the ratio between the sizes of large EBA settlements and the numbers of potential supporting settlements in their 10 km-radius hinterlands, by settlement sectors.

5.2.4. Economies in the Light of the Observed Site Distributions

From the results of the above analyses, a picture of a necessarily fairly complex, flexible EBA economy emerges for at least the *northern* and *central sectors* of settlement in the GWJ. Whichever practices were employed, and whatever socio-political systems affected these, major and minor settlements alike had to be able to cope with fluctuating water availability, occasional deficits of grain production, and negligible support from satellite settlements. Within the framework of the econoclimatic zones outlined in Section 1.3, what follows is a discussion of the results of this thesis that back up previously-proposed hypotheses as to what these strategies might have been.

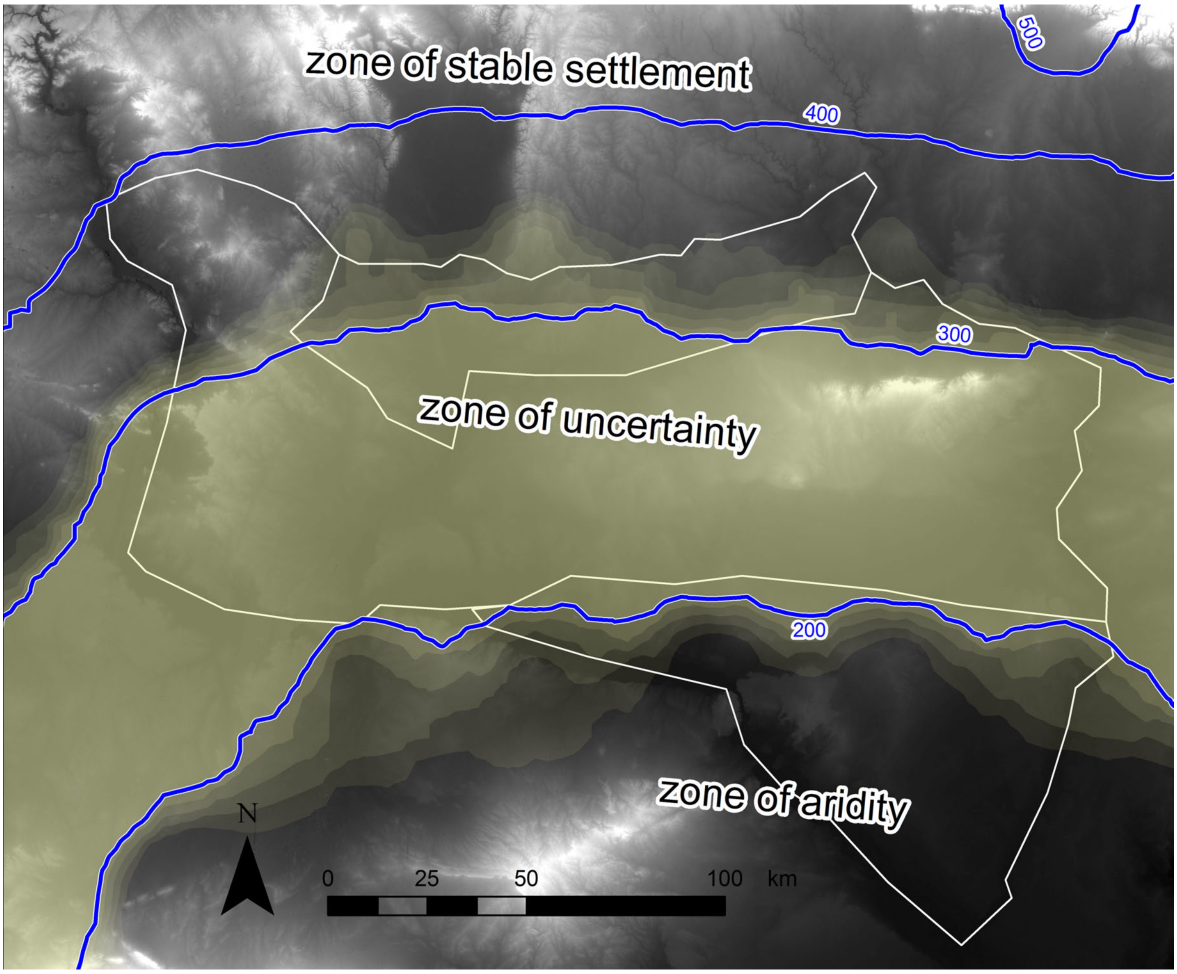


Figure 5.18: ASTER map showing the economic zone boundaries within the GWJ (see Section 1.3) in relation to settlement sectors (compare Fig. 5.1). Rainfall isohyet values from the GPCC.

5.2.4.1. Stable Diversified Agriculturalism

The sedentary agriculturalism of the *zone of stable settlement* corresponds to a region largely beyond the borders of the GWJ, located north of the *northern sector* (Fig. 5.18). The long-term durability of settlement in this region gives rise to a late 5th-3rd millennium settlement pattern that differs greatly from that of this thesis' study area. A moderate density of Halaf and 'Ubaid settlement in the *zone of stable settlement* gives way to an equally, if not more, prevalent LC occupation, including major centres such as Samsat and Oylum Höyük (see Fig. 1.4; Wilkinson *et al.* 2012: 170-173). In addition to sites with a local LC material culture dated to LC 1-3, Uruk settlements of LC 4-5 are also present; during a time when the GWJ saw a complete dearth of settlement. By contrast, settlement in this zone did not increase as drastically from the LC to the early EBA, during which smaller tells dominated. By the mid-late EBA, large centres such as Titrish Höyük (43 ha) had sprung up together with an increase in smaller sites (*ibidem*), though still not constituting a relative increase as large as that in GWJ.

These settlement dynamics are indicative of the stable settlement conditions that arise from the ease by which perennial agriculture can be practiced in this zone. The presence of at least a moderate scatter of settlements during all periods from at least the Halaf onwards emphasises this, as does the lack of any "boom-and-bust" settlement patterns (see below), despite some fluctuations in site density. The evenly-spread ubiquity of small tells would also likely have precluded the possibility of a mobile pastoral component to the local economy due to a scarcity of space between agricultural land (Wilkinson *et al.* 2012: 178-180). Instead, both diversified crop cultivation and pasture use appear to have been stable, remaining in a mostly unchanging ratio of economic preference to each other, resulting in the minimisation of risk that the benefits of reliable sufficient precipitation can afford sedentary populations. Though a solely agricultural economy could feasibly be practiced during average-to-wet years in the *northern sector* of the GWJ, this would not have been possible to sustain over a long-term period. Sooner or later, multiple successive dry years would render such a system incapable of providing sufficient returns to sustain an urban or sub-urban population.

5.2.4.2. Agro-pastoralism

This co-evolutionary system, combining the benefits of both agriculturalism and pastoralism, dependent of year-on-year climatic fluctuations, is associated with the *zone of uncertainty*, which would place its use largely in the *central sector* of settlement (Fig. 5.18). This incorporates the majority of the GWJ, and thus the model suggests agro-pastoralism was the most prevalent economic practice in the region. Several factors gleaned from the data gathered by this study back up this hypothesis. As previously discussed, the scarcity of smaller settlements that had the potential to supplement grain deficits of major centres in years of low yield itself indicates that some other coping mechanism must have been employed to ensure agricultural sustainability. Further, the long-term occupations of at least half a millennium at many sites, with some such as Tell Chuera (ca. nine centuries) occupied for even longer, indicates a flexible mechanism. As the frequent short-term variability of the climate of this zone is known (see Section 1.2.2.2), it is unlikely that annual precipitation values would have remained consistently favourable, or contained only few consecutive arid years, for such a long period of time. However, economies based on pastoralism alone, while easily feasible in this zone's climate, are also unlikely for a variety of reasons discussed below. Thus coping strategies must have been flexible enough to withstand fairly regular periods of low economic returns and insufficient agricultural yields, occasionally for multiple subsequent years.

This evidence is compounded by the observable size and complexity of many of the sites in the Greater Western Jaziran portion of the *zone of uncertainty*. Of those identified by this thesis' investigations, 28 are larger than 30 ha, of which 25 are located within or on the fringes of the *zone of uncertainty*, of which 9 likely date to the EBA and potentially earlier. However, given the evidence for mostly only few and small settlements existing in the GWJ during the LC, it is reasonable to assume that the bulk of these sites' areas developed as part of EBA processes alone. Though some of these probably benefited from their close proximity to perennial rivers (such as Tell Mabtuh Sharqi; under 10 km from the Khabur), the majority rely on more unpredictable watercourses such as the Wadi Hamar (see Section 1.2.2.3). As the establishment and/or expansions of these are very unlikely to be due to the slow build-up of populations over time (Chamberlain 2006; see Section 5.2.2.2), they are probably the results of a sudden increase due to mass migration and/or sedentarisation. As all but one of the likely EBA sites larger than 30 ha are two-tiered fortified tells, which exhibit massive ramparts, structured morphologies, and by extrapolation of data from Tells Chuera (Section 2.1.3.1) and Mabtuh Sharqi (Section 2.1.3.4) significant public building structures, they signify social and settlement complexity. It is further significant that the *zone of uncertainty* is the location of all *true Kranzhügel* and *Matin-variety* tells, as these are two of the densest inhabited varieties of such sites, both showing intensive human activity in their upper and lower towns, while the former additionally features the largest ramparts. It is also where all but one of the *Dakhliz-variety* tells are located, which although less monumentally prominent are likely *true Kranzhügel* in the making (Section 3.6.3.3) and thus part of the same manifestations of complex social structures, including organised hierarchical systems (see Meyer 2010d). These strongly suggest not only a population, but also a society that could not be sufficiently provided for by a pastoral economy alone.

More direct evidence for agricultural practices comes from the albeit limited examples of hollow ways in the region. As the restrictive nature of field boundaries, possibly in combination with a communally-managed land tenure system, is what promotes the consistent use of the same tracks and creates the hollow ways (see Section 5.2.3.1), it is unlikely that these would have formed in a purely pastoral system (Kouchoukos 1998: 388-389; Wilkinson 1993: 556-558). Though admittedly few examples of these routeway systems are found in the GWJ, over 90% of those existent are clustered in the northern half of the *zone of uncertainty* (compare Fig. 4.22). This emphasises both the agricultural and pastoral facets of the economy likely practiced in the majority of the region of study. These could be concentrated at individual sites employing both strategies, or be part of a more regional system, such as the distribution of livestock from river valleys into the steppe during winter, necessitating the growing of fodder crops along wadis in arid zones as proposed by Danti (2000: 279-280).

5.2.4.3. Nomadic Pastoralism

Fully flexible in terms of location, nomadic pastoralism is the best suited economy for coping with severe and frequent variations in climate, including consecutive years of minimal precipitation. Such practices are generally associated with the *zone of aridity*, however in the GWJ, at least, it is a component of the regional economic patchwork that should be considered for the *zone of uncertainty* also. Noting this, Kouchoukos (1998: 421-423) suggests that interaction with mobile pastoral groups was one of the mechanisms that supported large two-tiered fortified tells north and south of the Jebel Abd al-Aziz, spurred on by the prior commodification of wool (see Section 2.2.2). As is well known, precise evidence for past nomadism in any given geographical area is notoriously difficult to obtain and subject to much debate (see Cribb 1991: 65-83; Finkelstein 1992; Rosen 1992). Thus though mobile pastoralism in the *zone of aridity* is circumstantially well supported by textural sources (for example the Sutean nomads of the Mari archives [see Ziegler & Reculeau 2014]), and specifically in the GWJ by the identification of structures likely to be animal corrals, nothing definitive about the effects of this factor on settlement dynamics of the *zone of uncertainty* can be said using the data gathered. However, some reasonably confident indirect conclusions can be made.

Following from Kouchoukos' (1998: 421-423) postulations mentioned above, it could be said that the very existence of large settlements in the more arid regions of the *zone of uncertainty* (especially those which likely could not support themselves; see Sections 5.2.3.3-4) is evidence that nomadic groups operated in the area. However, this hypothesis relies on a great deal of certainty of carrying capacity calculations and the definite absence of small sites which may simply be invisible in the archaeological record. Conversely, it could be argued that the large amount of agricultural and pastoral land necessarily under the control of EBA settlements to ensure their sustainability would, at least around the Jebel Abd al-Aziz, have precluded much nomadic activity on the grounds of a lack of space. Another argument based on the existence of walled settlements is put forward by Diederik Meijer (2000: 206-207, also fn. 20), who points out that fortifications providing protection from raiding would only have been necessary in the presence of “regional colleagues”, presumably of a nomadic nature. More convincingly, the rapid fluctuations in precipitation levels in the *zone of uncertainty* strongly suggest that in times of drought, pastoralism would have been the only method of sustaining a population without the necessity to completely evacuate to more fertile regions such as river valleys. Thus even in the absence of permanent nomads occupying the semi-arid landscape, pastoral practices were likely implemented by ordinarily sedentary populations as required. This was no doubt the case in the *zone of aridity* also, where the potential sedentary, or at least semi-seasonal, settlements identified by this research would have been particularly reliant on the flexibility of the population in altering to (possibly reverting to) nomadic practices whenever required (see Bradbury *et al.* 2014, esp. 221-222). Such systems, no matter how efficiently employed, are not sufficient to explain the existence of some of the larger two-tiered fortified tells along the southern edge of the *zone of uncertainty*, however. These are best viewed in terms of a dominant trade economy, and are discussed in the next section.

Section 5.3: Analyses Based on Site Alignments

5.3.1. Site Alignments and their Significance

Alignments of sites have the potential to be able to reveal a lot about the economic, political, and, by extension, social dynamics of past societies. The existence of a geographical pattern of three or more sites suggesting a linear arrangement generally leads to the obvious supposition that pathways of human movement played a significant role in determining their locations, and thus their overall *raison d'être*. Such a conclusion must be treated with caution, however, as a plethora of factors other than the mere locations of sites go into the establishment of trade or military routes, including topography, water sources, and regional politics and economics. In the *central* and *southern sectors* of the GWJ, however, the flat landscape, free of any natural obstacles to straight routes, combined with the large size and massively fortified form of just a handful of aligned sites, clearly points towards routeways being responsible for their locations.

Nevertheless, site alignments in Mesopotamia in general have been interpreted in a variety of ways. In Southern Mesopotamia, they often indicate the courses of man-made water channels (levees) from the early 3rd millennium BC onwards (Hritz & Wilkinson 2006). In this case, the relative locations and dates of settlements are an indication of when certain channels first came into use, and the path in which they flowed. Thus it is important to note that routeways are not the only factor that can create site alignments; however the arid landscape of the southern GWJ does not allow for long-distance water installations to be an alternative explanation.

A more plausible cause of east-west settlement alignments in the transitional area between the *zone of uncertainty* and *zone of aridity* in the Jazira could have been the exchange of commodities between nomadic and sedentary groups, for which this narrow geographical band would have been the prime position for settlements focussing on such an economy (Wilkinson 2000b: 13). Finally, the contribution of trade routes to the creation of linear patterns in the archaeological landscape has been much studied also. In the vicinity of the GWJ, this has been investigated in the Middle Euphrates region, where Bronze Age sites north of Carchemish as well as Uruk sites in the Land of Carchemish survey area (see Fig. 1.3) have been found to align (Wilkinson *et al.* 2012). The latter in particular shows clear evidence of an east-northeast to west-southwest route, which "appears to have persisted through much of the Local LC and EBA as well, […] and perhaps as late as the Iron Age" (*ibidem*: 177). Additionally, for the eastern Jazira region it has been shown that long-distance routes often branched out into multiple paths, so that there was more than one way of getting from A to B (Wilkinson 1993), leading to multiple individual site alignments within a given area; something also proposed for the Jazira in general (including the GWJ) by Alessio Palmisano (2015: 203-204). These peripheral data can be extrapolated to the GWJ without much difficulty, as similar processes of colonisation and a growth in sheep husbandry occurred in both locales. However, considering a combination of the above two factors, as well as the political and economic factors discussed in Section 5.2.4, probably provides the most accurate picture of the dynamics leading to the two major EBA site alignments in the GWJ.

In addition to the above, there is more specific evidence of trade routes having existed in the southern regions of the GWJ in general, if not specifically during the EBA. Already in the 1950s, Albrecht Goetze (1953, 1964) proposed a Babylonian route that passed south of the Jebel Abd al-Aziz based on philological evidence from two tablets detailing an itinerary of a journey from Assur to Kanesh. This was later suggested to have passed through Khirbet Malhat by Kühne (1983), who further attested to the existence of contemporary caravan routes that went via the site at the time (Fig. 2.4; see Section 2.1.4.2). While the specifics of this hypothesis do not match up with Quenet and Sultan's (2014) assertion that Khirbet Malhat was abandoned from the start of the Akkadian period until the Iron Age, its core theory that east-west Babylonian routes crossed the *zone of aridity* within the GWJ remains valid, especially as the texts state that they crossed the Khabur and passed Tuttul. Goetze (1953: 61) equated the Babylonian Tuttul with Tell Ahmar, located on the northern Middle Euphrates, leading him to propose that these routes turned north soon after their crossing of the Khabur; however the settlement's subsequent identification with Tell Bi'a, on the confluence of the Euphrates and the Balikh, supports the idea of routes running further south within the GWJ (Fig. 1.5; see Krebernik & Strommenger 1998).

A more recent analysis of MBA trade routes in Northern Mesopotamia and Central Anatolia conducted by Palmisano (2015) combines textual data with spatial statistics such as least-cost path analyses to provide a more precise picture. This study found that analysing possible routes between Assur and Kanesh for the lowest energy expenditure based on landscape topography alone did not provide a result that concurs with philological evidence. Instead, Palmisano (2015: 201-204) argues that the Euphrates must be considered a significant physical and political barrier for caravans during the period, traversable only at known fording points such as Samsat (see Fig. 1.4) and Birecik (see Fig. 2.4). Indeed, when this is factored in to such analyses the easiest least-cost path follows the route south of the Jebel Abd al-Aziz proposed by Goetze, with a further possibility of a branch north of the mountain ridge (Palmisano 2015: Fig. 187). Overall, the section of the Assur-Kanesh route that traverses the Jazira is considered by Palmisano to have been the most dispersed due to the absence of physical barriers, whereas it is primarily north of the Euphrates that topography and political boundaries constrained the route to a narrow path.

Thus a multitude of routeways across the GWJ seems likely for the MBA, which in turn suggests itineraries based on a familiarity of this landscape that points to routes being existent in earlier times also; resulting from the growth of local trade in Anatolia demanding a link with Southern Mesopotamia (Barjamovic 2008: esp. 97-99). Wilkinson (2000b: 13-14) proposes a growth of interregional trade during the mid-late 3rd millennium, accounting for the "anomalous expansion" of certain sites, especially with regard to fortifications and lower towns. These mechanics will be discussed further in Section 5.3.4.

5.3.2. The *Northern Route*: Mashnaqa - Sweyhat/Halawa

The more northern of the two major east-west routes across the GWJ visible in the archaeological landscape was first proposed by Wilkinson (2000b: 12-14; 2004: 186-187), who argues that the cross-river pairings of Tells Hadidi and al-Sweyhat, as well as Tell Halawa and Selenkahiye, suggest major route systems forded the Middle Euphrates at those points (Fig. 5.19). These routes likely connected sites on the River Tigris (most notably Nineveh), and potentially Southern Mesopotamia, to the Mediterranean coast via the GWJ and the Amuq Plain (see Figs. 1.1 & 1.4). Such a route, Wilkinson (2004: 187) contends, "would logically tie together an otherwise curious alignment of unusually large sites, the growth of which is difficult to explain". Only one of these large sites, the *ringwall settlement* Tell Mu'azzar, is located within the Greater Western Jaziran steppe, however. Wilkinson's inferred stopping posts on the route are all undoubtedly significant sites, with the smallest measuring a sizeable 14 ha. However, they are rather unevenly spaced, with an overall standard deviation of 25 km from the mean distances between each site; while the closest are a reasonable 32 km from each other, the furthest spaced are some 90 km apart – a far greater distance than the daily distances reported covered in the Kültepe texts and by 19th and early 20th century travellers in the same region (see Section 5.3.4). However, this route is a very direct path between Tells Mashnaqa and al-Sweyhat; only 0.1% longer than the straight distance between the sites via the proposed fording location of Tell al-Seman. The route to Tell Halawa also deviates only minimally from the straight distance between sites, being 0.6% longer. Additionally, all the sites it passes have been dated to the EBA.

The results of this thesis supplement this proposed route significantly, demonstrating several further potential stopping points *en route*, many of which are walled sites (Fig. 5.19; Tab. 5.5). Firstly, three small tells, measuring between 0.5 and 1 ha, are located along the southern foothills of the Jebelet el-Beidha (on which Ras al-Tell is located) in a rough east-west alignment. While these sites can hardly be considered major stopping points, their position close to a presumably important religious site, as well as topographical location on the edge of a mountain outcrop which trade caravans would have been keen to avoid, lends credence to their role in Wilkinson's proposed route. Additionally, two of these (Tells Khnaizir and Burqu) have been dated to the EBA by the Yale Khabur Survey (Kouchoukos 1998: 368-369). More significantly, there is a clear straight alignment of the westernmost of these sites, the uniquely fortified Tell Jerwa, and Tell al-Seman.

To the west of the Balikh, the route to Tell al-Sweyhat passes very close to Site 391, an unusually-located tell with clear hollow ways (Hollow Way Network 3). Though there is

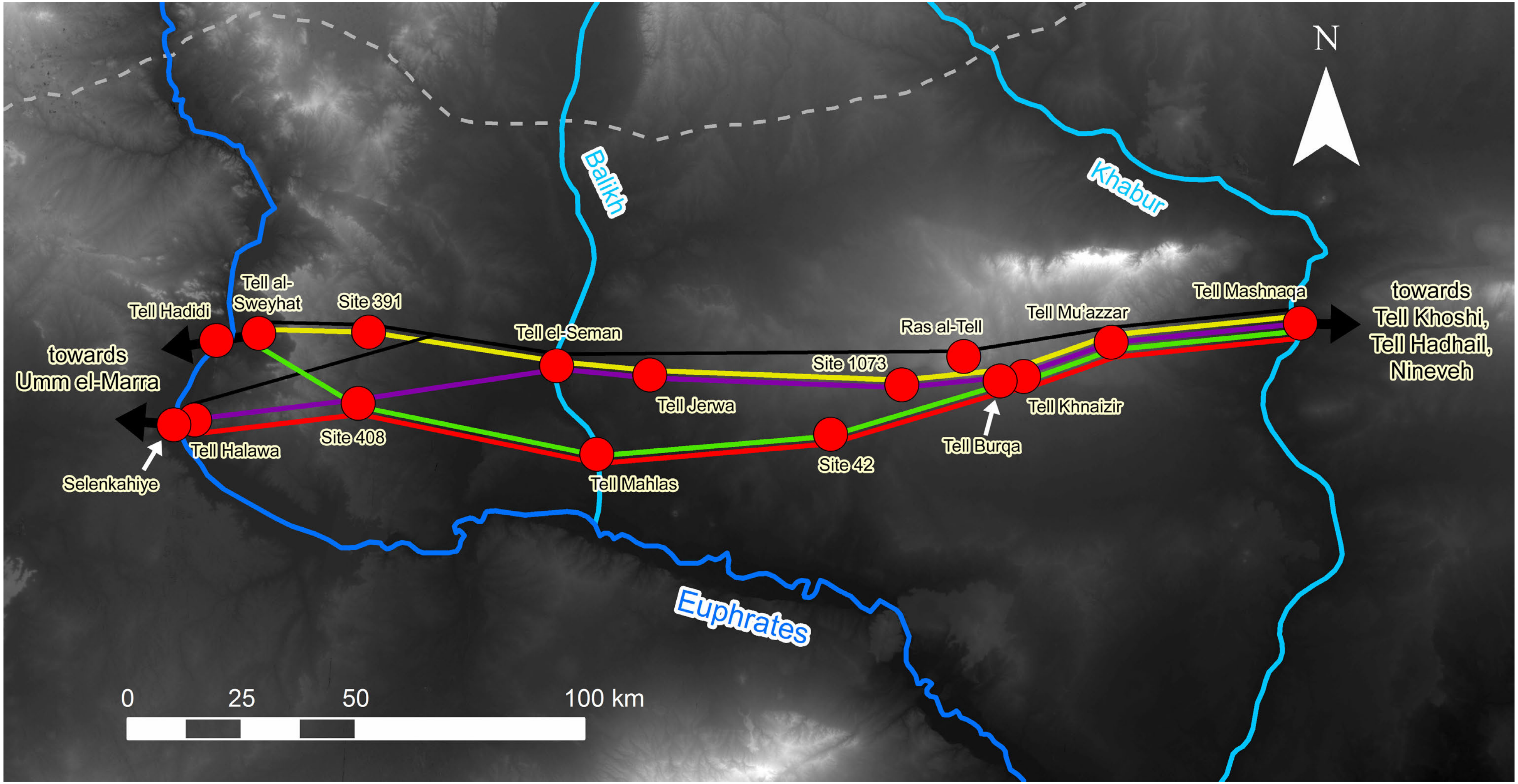


Figure 5.19: Representational ASTER map showing possible routes and locations of stopping points along the Tell Mashnaqa to Tell al-Sweyhat or Tell Halawa route. The route marked in black is that proposed by Wilkinson (2000b; 2004); other colours relate to Table 5.5.

sites along route (bold signifies location on a river)	size of site	known occupation period(s)	distance from previous site	significance
Tell Mashnaqa	4 ha	Ubaid, LC, EBA	–	long occupational sequence; dominated by granary storage installations
Site 41 (Tell Mu'azzar)	14 ha	EBA	42 km	*ringwall settlement;* second largest site south of the Jebel Abd al-Aziz; numerous clear hollow ways
Site 490 (Tell Khnaizir)	0.5 ha	EBA	21 km	on the foothills of Djebelet el-Beda, upon which sits the important religious site of Ras el-Tell
Site 491 (Tell Burqa)	1 ha	EBA, Iron Age, Roman/Byzantine	5 km	on the foothills of Djebelet el-Beda, upon which sits the important religious site of Ras el-Tell
Site 1073	0.5 ha	–	21 km	small tell site; no particular significance
Site 1065 (Tell Jerwa)	1.3 ha, possibly up to 35 ha	–	55 km	very unusual two-tier fortified site with a potentially large size
Tell al-Seman	9 ha (west); 10 ha (east)	EBA, MBA, LBA	20 km	large tell with long occupational sequence spread across both banks of the Balikh (river-crossing site); possible surrounding wall
Site 391	7 ha	–	42 km	isolated tell site with very prominent hollow ways, a rarity for this area
Tell al-Sweyhat	35-45 ha	EBA-early MBA, Hellenistic, Roman/Byzantine	24 km	large tell with prominent outer wall; Tell Hadidi on the opposite bank of the Euphrates suggests river crossing site
Site 408	5 ha, possibly up to 20 ha	–	44 km	isolated *ringwall settlement* of an unusual morphology with a potentially large size
Tell Halawa A	12 ha	EBA, MBA, Roman/Byzantine	37 km	major site with EBA public buildings and city wall; Selenkahiye on the opposite bank of the Euphrates suggests river crossing site
Site 42	6 ha, possibly up to 20 ha	–	40 km	isolated *ringwall settlement* of an unusual morphology with a potentially large size
Tell Mahlas	6 ha	EBA	50 km	medium-sized tell on the Balikh with a mid-late 3rd millennium fortification system
Site 408	5 ha, possibly up to 20 ha	–	53 km	isolated *ringwall settlement* of an unusual morphology with a potentially large size
Tell al-Sweyhat	35-45 ha	EBA-early MBA, Hellenistic, Roman/Byzantine	26 km	large tell with prominent outer wall; Tell Hadidi on the opposite bank of the Euphrates suggests river crossing site
Tell Halawa A	12 ha	EBA, MBA, Roman/Byzantine	37 km	major site with EBA public buildings and city wall; Selenkahiye on the opposite bank of the Euphrates suggests river crossing site

Table 5.5: Details of the proposed routes from Tell Mashnaqa to Tell al-Sweyhat and Tell Halawa, as well as the significance of potential sites *en route* (data collated from my research and Akkermans & Schwartz 2003; Curvers 1991; Danti 2000; Hempelmann 2005; Wilkinson 2004). The coloured lines refer to the routes marked in Figure 5.19.

no dating evidence for this settlement, its morphology suggests an EBA occupation of some longevity, as the emanating routeways indicate that long-term agriculture was practiced in its hinterland. Additionally, the longest hollow way, presumably part of an intersite route, runs not along the easily accessible valley to the south-southwest, but west-southwest towards a sinuous valley that eventually leads towards the Euphrates floodplain near Sweyhat. Tell al-Seman and Tell Halawa, meanwhile, are on a line with the *ringwall settlement* Site 408, located about halfway between these. These routes deviate from direct distances (via Tell al-Seman) not much more than the Wilkinson routes; the Tell Mashnaqa to Tell al-Sweyhat route is 0.7% longer, while the Mashnaqa to Halawa route is 0.6% longer. Additionally, the longest distance between any of the above sites is, at 55 km, far less than that of Wilkinson's proposed route, while the standard deviation from the mean distances is a much smaller 13 km.

An alternative route based on the same starting and ending locations can be proposed fording the Balikh at Tell Mahlas, 20 km south of Tell al-Seman. From Tells Khnaizir and Burqu, at the foothills of the Jebelet al-Beda, a straight path to Tell Mahlas passes within 4 km of the isolated *ringwall settlement* Site 42, which appears as a major crossroads even on CORONA images from the 1960s. West of the Balikh, the route to Tell al-Sweyhat passes Site 408, from which it is also possible to branch off west-southwest towards Tell Halawa. These routes both measure just 0.8% longer than direct paths via Tell Mahlas, while the overall distances from Tell Mashnaqa are only 6 km longer compared to fording the Balikh at Tell al-Seman for the route to Sweyhat; 2 km longer for Halawa. The standard deviation from the mean site-to-site distances for these routes is, at 11 km, also comparable. Thus this route, while heading a good deal further south than more direct paths, is a valid variation that adds minimal overall travel distance.

5.3.3. The *Southern Route*: Asamsani/Husen - Bi'a/Sweyhat/Halawa

This route, which to my knowledge has not been previously proposed, is chiefly suggested by the existence of the "Malhat line" in the *southern sector* of settlement. The clear alignment of four prominent fortified tell sites (the site-to-site distance between the extremities of which adds up to only 0.1% longer than a direct path) in such an arid region devoid of other EBA settlement alone strongly suggests a trade route. Greater credence is however lent to this hypothesis by the linear connections this alignment shows with other sites in the vicinity of the Western Jaziran steppe, allowing multiple routes to be proposed with some certainty (Fig. 5.20; Tab. 5.6). Geographically, the obvious Khabur fording site suggested by the "Malhat line" is Tell Asamsani, a 10 ha site with EBA material that may

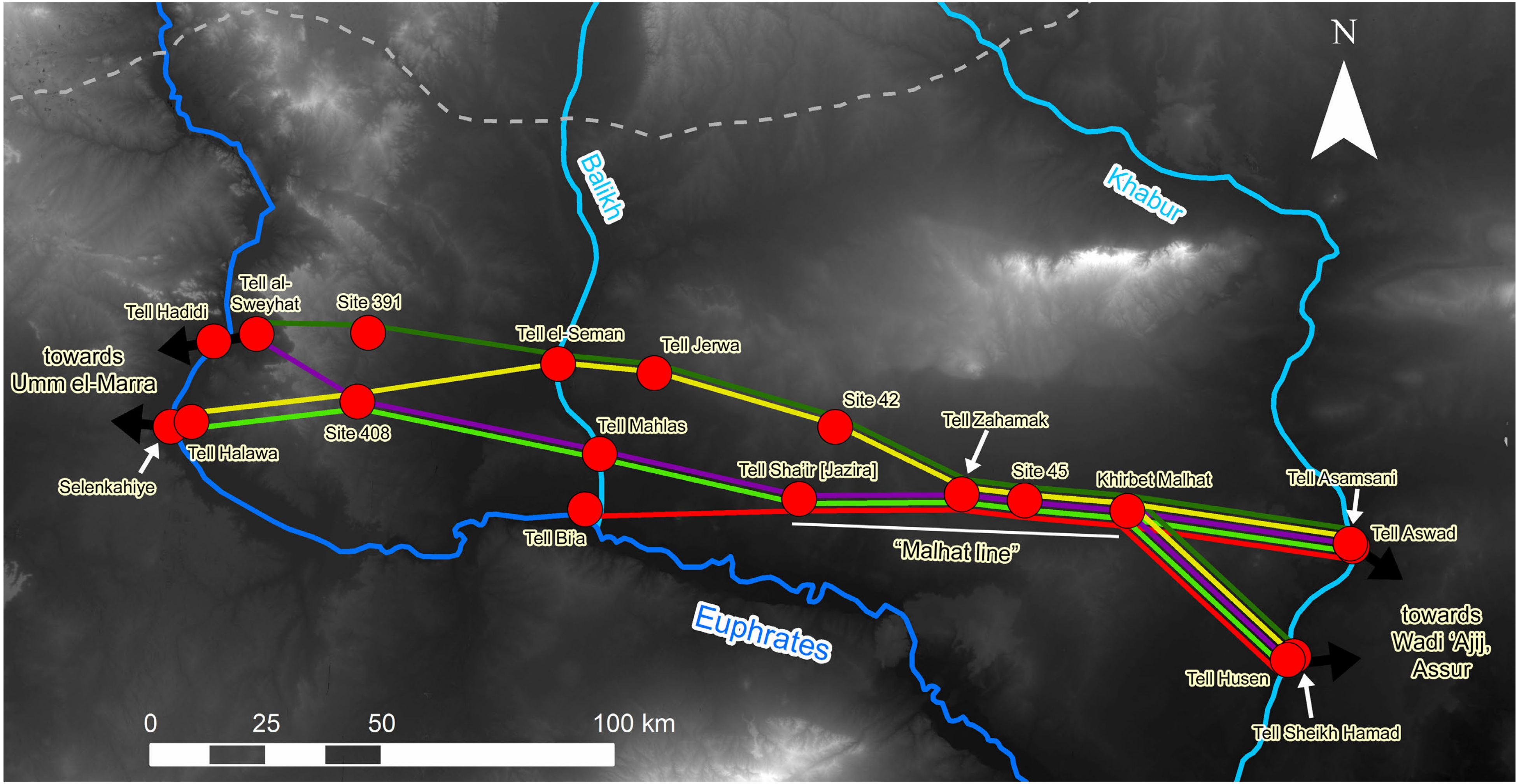


Figure 5.20: Representational ASTER map showing possible routes and locations of stopping points along the Tell Asamsani or Tell Husen to Tell Bi'a, Tell al-Sweyhat, or Tell Halawa route. The colours of the routes relate to Table 5.6.

sites along route (bold signifies location on a river)	size of site	known occupation period(s)	distance from previous site	significance
Tell Asamsani	10 ha	EBA, MBA, LBA, Iron Age, Roman/Byzantine, Islamic	–	two-tiered tell with a very long occupational sequence; Tell Aswad on opposite bank of the Khabur suggests river crossing site
Tell Husen	5 ha	LC, EBA, MBA, LBA, Iron Age	–	long occupational sequence; Tell Sheikh Hamad on the opposite bank of the Khabur suggests river crossing site
Site 46 (Khirbet Malhat)	33 ha	EBA, Iron Age	49 km (from Asamsani) 47 km (from Husen)	very large isolated *ringwall settlement* with extremely prominent fortifications
Site 45	9 ha	–	22 km	isolated two-tier fortified tell with an unusual morphology
Site 44 (Tell Zahamak)	10 ha, possibly up to 50 ha	–	13 km	isolated two-tier fortified tell with an unusual morphology and a potentially very large size
Site 43 (Tell Sha'ir [Jazira])	21 ha	–	35 km	large isolated two-tier fortified tell with an unusual morphology
Tell Bi'a	35-40 ha	EBA, MBA, LBA, Roman/Byzantine, Islamic	46 km	largest tell in the southern Balikh; fortified city with a temple, a palace, and elite tombs; identified as Old Assyrian *Tuttul*
Tell Mahlas	6 ha	EBA	44 km	medium-sized tell on the Balikh with a mid-late 3rd millennium fortification system
Site 408	5 ha, possibly up to 20 ha	–	53 km	isolated *ringwall settlement* of an unusual morphology with a potentially large size
Tell al-Sweyhat	35-45 ha	EBA-early MBA, Hellenistic, Roman/Byzantine	26 km	large tell with prominent outer wall; Tell Hadidi on the opposite bank of the Euphrates suggests river crossing site
Tell Halawa A	12 ha	EBA, MBA, Roman/Byzantine	37 km	major site with EBA public buildings and city wall; Selenkahiye on the opposite bank of the Euphrates suggests river crossing site
Site 42	6 ha, possibly up to 20 ha	–	31 km	isolated *ringwall settlement* of an unusual morphology with a potentially large size
Site 1065 (Tell Jerwa)	1.3 ha, possibly up to 35 ha	–	40 km	very unusual two-tier fortified site with a potentially large size
Tell al-Seman	9 ha (west); 10 ha (east)	EBA, MBA, LBA	20 km	large tell with long settlement sequence spread across both banks of the Balikh (river-crossing site); possible surrounding wall
Site 391	7 ha	–	42 km	isolated tell site with very prominent hollow ways, a rarity for this area
Tell al-Sweyhat	35-45 ha	EBA-early MBA, Hellenistic, Roman/Byzantine	24 km	large tell with prominent outer wall; Tell Hadidi on the opposite bank of the Euphrates suggests river crossing site
Site 408	5 ha, possibly up to 20 ha	–	44 km	isolated *ringwall settlement* of an unusual morphology with a potentially large size
Tell Halawa A	12 ha	EBA, MBA, Roman/Byzantine	37 km	major site with EBA public buildings and city wall; Selenkahiye on the opposite bank of the Euphrates suggests river crossing site

Table 5.6: Details of the proposed routes from Tell Asamsani and Tell Husen to Tell Bi'a, Tell al-Sweyhat, and Tell Halawa, as well as the significance of potential sites *en route* (data collated from my research and Akkermans & Schwartz 2003; Curvers 1991; Danti 2000; Hempelmann 2005; Krebernik & Strommenger 1998; Röllig & Kühne 1977-78; Wilkinson 2004). The coloured lines refer to the routes marked in Figure 5.20.

correspond to the Middle Assyrian settlement of *Qatni*, referenced as *Qattunan* in the Mari texts (Röllig & Kühne 1977-78: 123[84]; Fales 2010: 75 fn. 45). It is interesting to note that this site, now on the western bank of the river, may originally have lain on its eastern side; however a complementary site definitely on the eastern bank is Tell Aswad, which anecdotally contains EBA material (Röllig & Kühne 1977-78: 123-124). An alternative crossing point on the Khabur may be located at the complementary sites of Tell Husen (western bank) and Tell Sheikh Hamad (Middle and Neo-Assyrian *Dur-Katlimmu*; eastern bank), both of which contain substantial EBA material. Though these sites are located too far south to be considered in alignment with the "Malhat line", they are in fact 2 km closer to the first site on the line (Khirbet Malhat) than Tell Asamsani.

East of the Khabur, these routes can be extrapolated to have continued from either Tells Asamsani/Aswad or Husen/Sheikh Hamad via the Wadi 'Ajij area to Assur on the Tigris, as well as to Southern Mesopotamia (see Figs. 1.1 & 1.4). The Sheikh Hamad branch of this route has already been proposed, and backed up by substantial evidence, for the Middle Assyrian period (Pfälzner 1993: 92-96). However, as both Tell Sheikh Hamad and Assur were also occupied during the EBA (Dittmann 1990), it is not unreasonable to assume that it existed a millennium earlier also. The Western Jazira sections of the routes proposed below have also been largely previously proposed for the LBA, by Kühne (2000: 275, Fig. 2); however based on modern well locations without any material or philological evidence.

Following this proposed route westwards across the GWJ, the major site of Tell Bi'a (Old Babylonian *Tuttul*) is easily reached from either Tells Asamsani or Husen along the "Malhat line", as is Tell Mahlas, from which the same routes to Tells al-Sweyhat and Halawa (and beyond) can be followed as proposed for the *northern route*. This route from Asamsani to Sweyhat or Halawa is only 0.6-0.7% longer than a direct route via Mahlas. The same routes originating at Husen deviate by far more, around 3.4-3.5% longer. This, however, should be viewed in the context of the relative impossibility of trade caravans charting a course across the arid south of the Western Jazira, especially as the closest westwards distance from Tell Husen to the Euphrates measures 85 km (see next section).

It is also possible to propose a route originating at Tells Asamsani or Husen using the alternative Balikh fording site of Tell al-Seman. These branch off the "Malhat line" at Tell Zahamak to the *ringwall settlement* Site 42 before joining the *northern route* at Tell Jerwa. Though these routes appear to trace a somewhat circuitous course to the north when mapped (see Fig. 5.20), they in fact deviate the same or less from direct paths via al-Seman

[84] Though note that Röllig and Kühne (1977-78) mention the tentative identification of Tell Asamsani as the Babylonian *Iyatu*, a correlation which however has not been confirmed by subsequent philological research.

as do the routes via Mahlas. In terms of overall distance, that to Sweyhat is the same via Mahlas or al-Seman, while that to Halawa is only 3 km longer via al-Seman. Thus both Balikh fording sites are equally likely to have been used. All of the above routes feature reasonable distances between sites (the greatest being 53 km), and even spacing, with standard deviations from the mean distances of between 12 and 15 km.

5.3.4. Trade Route Economies

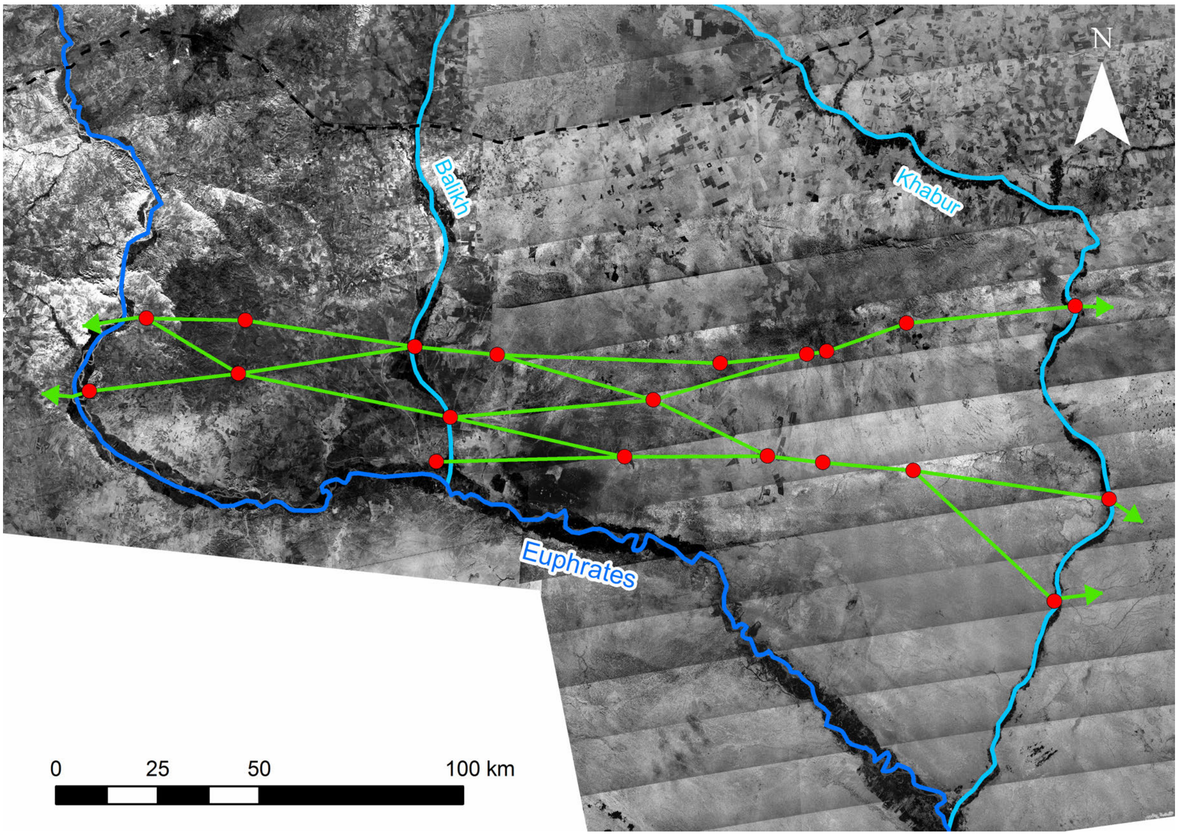


Figure 5.21: CORONA satellite map showing the complete network of routes crossing the southern portion of the GWJ proposed in this thesis.

With their consistent stream of goods transfers and human interaction, generally enduring for longer periods of time than local climate fluctuations, trade routes can act as an economic buffer, levelling out the uncertainties incurred by settlements in environmentally marginal regions. This factor helps answer two of the major questions that arise from the existence of the large settlements in the *zone of aridity* (or southern limit of the *zone of uncertainty*) of the GWJ: Why were these settlements located so far south, when much of the area north of them is devoid of sites and was thus probably available for settlement; and why did they manifest themselves as large fortified cities? Regarding the former question, the locations of major sites such as Tells Mahlas, Bi'a, Asamsani, and Husen on rivers lend credence to the proposition of trade routes across the southern steppe between these. While environmental factors doubtless would have often made it more desirable to follow a slightly longer route (e.g. along water sources) than a straight path across arid lands, routes hugging the banks of the Khabur, Wadi Hamar, and Euphrates clearly cover significantly longer distances (see Fig. 5.21), all representing an increased journey of between 60 and 150 km (around 27-67% longer). Assuming donkeys were the primary beasts of burden in Northern Mesopotamia at the time (Arbuckle 2012: 214; Philip & Bradbury 2010: 160, with further references), itineraries of early 20th century explorers in the region using the same mode of transport suggest that daily travel distances range between 35 and 50 km, taking for example two days from al-Su'ar to Tell Zahamak via Khirbet Malhat (Musil 1927: 86-89), and ten hours from Der al-Zor to al-Su'ar (Smith 1904: 278-279; see Fig. 1.1). Considering the strain of carrying trade goods on the animals, which likely would have borne weights greater than the luggage of early Western explorers, these distances must be considered a maximum for the EBA. This is corroborated by accounts of travel times during the Assyrian period in texts from Kültepe, which put the average daily travel distance of donkey caravans at 30 km (Dercksen 1996: 11-13). It therefore follows that routes between the above sites following rivers would have incurred a significant two to four extra days' journey time; twice that for a return journey. Thus the desire by tradesmen to cut across the topographically easily-traversed flat steppe is well understandable.

The requirement for stopping points along such routes, with facilities for caravans to remain overnight in safety and stock up on provisions, is sufficient to account for settlements' locations in the south of the GWJ, as well as their east-west spacing corresponding to roughly one days' travel distance. This explanation, however, has ramifications on the political landscape of the southern *central sector* and *southern sector*. It is known from the Mari texts that that city's caravans were often accompanied by security forces to protect them from raiders *en route*, and the more protection a trading party had, the more direct a route they could risk to take, spending a greater amount of time travelling and camping long distances from settlements (Dercksen & Donbaz 2001). Indeed, by the MBA, routes across the GWJ traversed significantly more than a day's worth of travel time between protective settlements. For example, the proposed Assur-Kanesh route calculated by least-cost path analysis crossing south of the Jebel Abd al-Aziz (discussed in Section 5.3.1) runs from Assur to Harran (the Assyrian *Harranum*, 20 km north of modern-day Tell Abyad; see Fig. 1.1), a distance of ca. 400 km, without passing any major sites of known MBA occupation (Palmisano 2015: 201-204, Fig. 187); especially within the GWJ, which is known to be almost entirely devoid of settlement during this time (Section 5.2.2). Thus the need for frequent stopping points along EBA routes indicates that either the travellers of this period did not have access to sufficient security forces for hire, or that the southern GWJ was a much more dangerous area than it became during the MBA, with large numbers of unchecked raiders and little control. This implies a landscape devoid of any strong political power, with regional centres that had control over their immediate hinterlands, but did not provide stability to the steppe beyond. Considering the absence of a clear single prominent site in this part of the steppe (such as Tell Chuera for the *northern sector*), it seems likely that this was indeed a fragmented political landscape, as discussed in Chapter 6.

Sites along these routes can also be considered as trading posts in their own right; locations where caravans travelling in different directions could barter goods, especially where multiple routes meet (e.g. Khirbet Malhat, Site 42, Tell Jerwa, and Site 408; Fig. 5.21). However, these needs can also explain the latter question posed above, regarding the morphologies of these settlements, when one considers the characteristically "empty" appearance of the "lower towns" of the *ringwall settlements* and uncategorised two-tiered fortified tells in the *southern sector*. Though structures have been identified in the lower town of Khirbet Malhat, these required magnetometry imagery to recognise, a far cry from the massive structures, many of stone, that were even visible on the surface to von Oppenheim at e.g. Tells Chuera and Mabtuh Sharqi (Moortgat-Correns 1972: 27-32). At the 3rd International Landscape Archaeology Conference in Rome, I proposed that such morphologies, when taken into consideration together with the locations of these sites, suggest "lower towns" that were largely spaces for the use of traders and caravans to camp safely for the night, morphologically akin to Roman military forts with substantial outer walls yet ephemeral living quarters within (Smith 2014b). Since then, I have become aware that such a purpose has already been proposed for the "lower town" of Tell Beydar, for which Joachim Bretschneider (2005: 55) contends that "traders were [very likely] allowed to spend the night between the [site's inner and outer] walls, safe from highway robbers but not themselves posing a danger to the sleeping citizens of Nabada"[85]. Bretschneider further suggests that in times of strife, farmers from surrounding settlements could have taken refuge in the "lower town". Though the latter is unlikely to have occurred much in the southern GWJ due to the general lack of smaller settlements surrounding large tells

[85] Though Bretschneider does not explicitly state so, this presumably only holds true for EJZ 1 to Final EJZ 2, after which Tell Beydar's outer wall fell into disrepair (Pruß 2013a: 134-136). However, despite the site's lower town becoming uninhabited at this time, it is perfectly possible that the space it previously occupied continued to be used by traders as a campground.

(see Section 5.2.3.4[86]), the former is definitely applicable to its sites; even more so as a greater proportion of the economy of these likely depended on trade than did Tell Beydar.

This further suggests that both the inner and outer walls of the GWJ's southern *ringwall settlements* were constructed simultaneously at the outset of occupation (as is the case at Beydar); a significant difference compared to the dynamics of a *true Kranzhügel* like Tell Chuera, as previously noted by Creekmore (2008: 342). Though outer walls are only dimly visible by remote sensing at sites such as Tell Zahamak and Site 45 (and potentially do not exist at all), it is nevertheless likely that some form of outer defences were in place, albeit of an equally ephemeral nature as the encampments within. The same can be applied to Tell Jerwa, which fits Creekmore's description of a "fort-town" very accurately. The central well-fortified space of this site, a mere 100 metres in diameter, could have been the location of a trading place and/or a well, and perhaps been the residence of a couple of administrators[87]. The 35-hectare space around this, meanwhile, would have provided ample area for traders to camp, around which some fortifications of a temporary nature may have been constructed. Thus it appears very likely that trade not only influenced the locations, but also the morphologies of sites in the south of the GWJ, explaining their differences from fortified tells in the north.

As with all the economic practices described in this chapter, it is important to emphasise that trade route economies also should not be viewed in isolation, and that they likely operated in conjunction with other methods of sustainability. The albeit meagre agricultural potential that could be exploited by sites in the southern GWJ would have provided a background level of resources which long-distance trade, as well as exchange with more local mobile pastoralists, supplemented (Kouchoukos 1998: 386; Wilkinson 2000b: 12-14). Regarding the latter, settlements in the northern *zone of aridity* and southern *zone of uncertainty* (the two-tiered fortified tells along the "Malhat line" in particular) were ideally geographically placed to interact with both sedentary and transhumant populations, benefiting from exchange with and between both (Meijer 2000: 206-207). Additionally, the presence of established routes across the steppe could have attracted groups of travellers whose purpose was other than trade. One such group may have been military companies from major centres. Mari, for example, could have taken advantage of the lack of centralised control of the *southern sector* by using it as a quick

[86] Though note that despite their near-invisibility in the landscape (even at a slight distance on the ground), several small habitations were identified by the Khirbet Malhat Survey (Quenet & Sultan 2014; see Section 2.1.4.8).

[87] Tell Jerwa's close proximity to the densely-settled Balikh, and Tell al-Seman in particular (20 km away), means that these could have been local administrators themselves controlled by hierarchically higher management at another site.

passageway for troops and supplies to reach the southern Euphrates-Balikh steppe. It is known from texts both that this area was fought over by Mari and Ebla and that armies used trade routes to travel long distances during this time (Archi 2014; Meyer 1996: 155-156). These armies and their suppliers would thus have likely further contributed to the economy of settlements in the steppe in the form of payments for the use of facilities at stopping posts, providing an additional income. Indeed, they may have been fundamental to the initial establishment of some of these routes, as the time of the first indications of Mari's influence on the Euphrates-Balikh region coincides with the establishment of Khirbet Malhat (EJZ 3a; Danti 2000: 306-308). Together, the ultimate aim of combining these economic practices was the same in this area as in the central-to-northern *zone of uncertainty*: to cope with the uncertain fluctuations of the local environment, sustaining settlement through unproductive seasons so that the rewards of profitable seasons could be reaped.

Section 5.4: Comparative and Theoretical Models

5.4.1. The Regional Context

5.4.1.1. Adjacent Regions: Three Case Studies

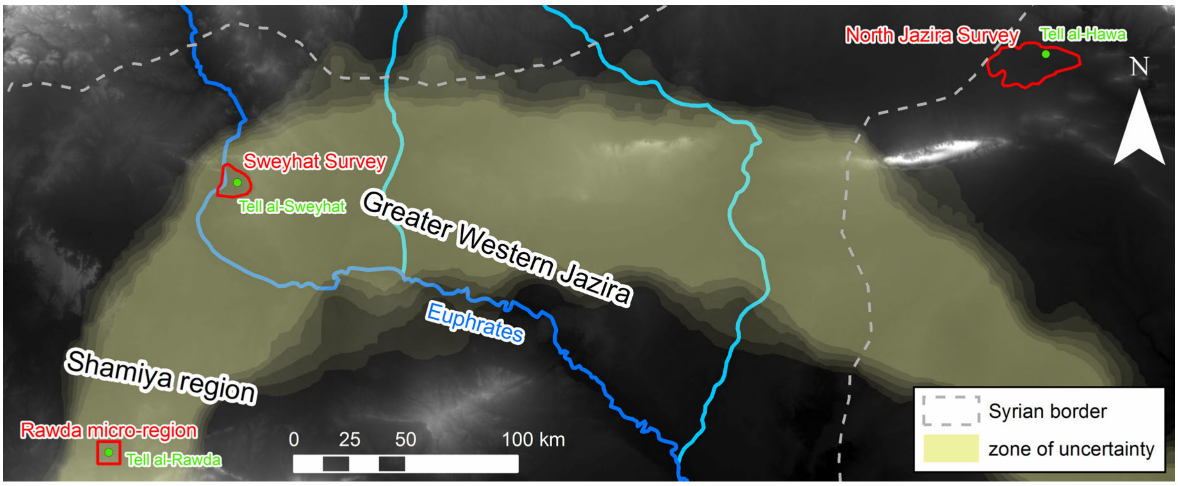


Figure 5.22: ASTER map showing the locations of the comparative regions and surveys discussed.

Large portions of the regions surrounding the GWJ have been subject to extensive archaeological research, including a number of intensive surveys (see Fig. 1.3). This allows for accurate comparisons of LC-EBA settlement dynamics to be conducted across Northern Mesopotamia. For the purposes of this study, three regions have been selected that provide a representative comparison with different permutations of environmental conditions: the Middle Euphrates (in the *zone of uncertainty*, yet on a perennial watercourse), the northeastern Jazira (well within the *zone of stable settlement*), and the Shamiya region (beyond Northern Mesopotamia, but environmentally very similar to the GWJ; Fig. 5.22). One survey per region was selected that each featured a single dominating EBA site; these could then be accurately compared with the most intensive survey in the GWJ, the Wadi Hamar Survey and its dominant site of Tell Chuera.

The Middle Euphrates: the Sweyhat Survey

The Sweyhat Survey was conducted in 1974, 1991, and 1992 by Tony Wilkinson, who also published the results extensively (Wilkinson 2004). This study covered a small area of 150 km^2, situated primarily within the wide fertile plain that surrounds Tell al-Sweyhat, but also covering parts of the Euphrates river terraces and the high limestone bluffs that lead to the upland plateau of the Euphrates-Balikh steppe (*ibidem*: 19-28). Receiving between ca. 270 and 290 mm annual rainfall, it clearly falls within the *zone of uncertainty*. Settlement prior to the EBA is very sparse in this region, with the only significant assemblages (one each from the Ubaid and early LC) existing at two diffuse sites along the Euphrates bank. Similarly to the Wadi Hamar area, settlement declines to almost zero by the mid-LC, with the latest local LC material potentially dating to LC 3, while no Uruk-style ceramics were found by surface collections (*ibidem*: 134-135). Though excavations at various sites in the vicinity have produced Uruk assemblages, these mostly seem to date to the very end of the 4th millennium BC (Lawrence 2012: 154-156).

In marked contrast, the early EBA sees a dispersed pattern of small settlements across the fertile plain, as well as the start of urban settlement at Tell al-Sweyhat (and nearby Tell Hadidi on the opposite bank of the Euphrates). However, this increase of settlement was not the EJZ 0 “explosion” of the Wadi Hamar region, with a moderate number of sites and an occupation covering only 2 ha at Sweyhat (Wilkinson 2004: 136-138). The mid-late EBA, however, sees Sweyhat grow to 15 ha, then 30 ha[88] with the construction of its large-scale ramparts. Though this site has traditionally not been strictly classified as a “Kranzhügel”, there is no reason not to class it as a two-tiered fortified tell, as with its upper and lower towns, and clear outer wall, it meets all the necessary criteria. During this time settlements in Sweyhat’s hinterland increase in number, as well as clustering around the main site somewhat. By the late EBA, this clustering ceases to be prominent, and a

[88] On the opposite side of the Euphrates, Tell Hadidi reached the even larger size of 56 ha at some point during this period. Though the geographic proximity (only 9 km) of two large settlements can easily be compared to several examples in the Wadi Hamar region (e.g. Tells Bogha and Khanzir: 7 km apart), the boundary of the river negates this proximity somewhat for practical purposes of interaction, as well as providing a natural border to potential areas of control. Thus the socio-political dynamics of large sites in these two regions were likely quite different.

clear three-level site hierarchy exists across the entire plain (*ibidem*: 138-142). Apart from Sweyhat itself, two other settlements show evidence of fortification walls, though not in a two-tiered formation. Subsequently, the early MBA, when Tell al-Sweyhat declined and was eventually abandoned, sees a return to the levels of settlement of the early EBA in its surrounding area.

Thus several significant differences from the Wadi Hamar area can be observed: not only are the periods of major increase and decrease of settlement shifted by a few centuries, but each is more gradual, with no real "collapse", but merely a return to lower levels of human activity. Additionally, the average density of EBA settlements is, at 0.063 sites per km^2, nearly four times that of the *central sector*, which it is geographically part of (see Section 5.2.1.2). Nevertheless, the overall pattern of an increase in settled area at both large centres and smaller settlements, indicating a migration or sedentarisation, is consistent with the remainder of the *zone of uncertainty* to the east, despite the presence of a reliable perennial watercourse.

The northeastern Jazira: the North Jazira Survey

Some 150 km east of the GWJ, the North Jazira Survey was conducted between 1986 and 1990 under the direction of Tony Wilkinson, and published in greatest detail by Wilkinson and David Tucker (1995). Covering 525 km^2 (a very similar size to the Wadi Hamar Survey), its area comprises the mostly flat, slightly undulating plain of the Jazira to the east of the Khabur alluvial basin. This fairly uniform landscape, broken by intermittent wadis, is very similar to the northern two-thirds of the GWJ; however it receives a far greater annual rainfall of between ca. 370 and 390 mm, placing it in the *zone of stable settlement* (Wilkinson & Tucker 1995: 3-7). Within the surveyed area, the major regional urban centre of Tell al-Hawa is the largest settlement. Unlike anywhere in the GWJ, pre-EBA settlement within the North Jazira Survey is fairly common, with a moderate number of stable evenly-dispersed small settlements existing from the 7th to the early 3rd millennium BC. Tell al-Hawa meanwhile began as a small settlement in the 6th millennium BC, growing into a large centre of 16 ha by the end of the Ubaid and reaching 33-50 ha by the LC (*ibidem*: 43-45); one of several "centres" that emerged at this time (Lawrence & Wilkinson 2015: 329-333).

The early EBA sees a possible slight reduction in the size of Tell al-Hawa (from 50 to 42 ha), and a very slight decrease (by 6 ha) of total settled area. These figures are remarkably different from the Wadi Hamar area, but more importantly mask a significant reorganisation of the settlement landscape of the North Jazira Survey. Most notably, the entire southwestern half of the survey area is abandoned, becoming entirely devoid of sites, while a greater number of medium-sized tells (reaching 8-10 ha) cluster in the northeastern sector. However, none exist within a 3-5 km radius of Tell al-Hawa, which remains one of the handful of remaining large centres in the eastern Jazira following the "ruralisation" process of the Ninevite 5 period (Lawrence 2012: 198-202; Wilkinson & Tucker 1995: 49-50; see Ur 2010: 401-404). This clear sign of settlement nucleation continued in the mid-late EBA, when Tell al-Hawa grows again, this time reaching its maximum size of 66 ha, while other settlements, still confined to the northeast of the survey area, decrease in number but not in combined area (Wilkinson & Tucker 1995: 50-54). At the same time, secondary centres grow to a maximum of 19 ha, and while none can be considered two-tiered fortified tells, some do show evidence of substantial city walls. The settlement pattern of the early MBA further contradicts that of the Wadi Hamar, with both settled area and numbers of settlements increasing, while Tell al-Hawa remained at around the same size (*ibidem*). Thus the general LC-EBA settlement dynamics of the North Jazira Survey do not match anything seen in the GWJ during this time, with a permanence of human occupation enabled by higher precipitation values, and indicative of its role as a "core" region of LC settlement (see Section 5.4.2.1).

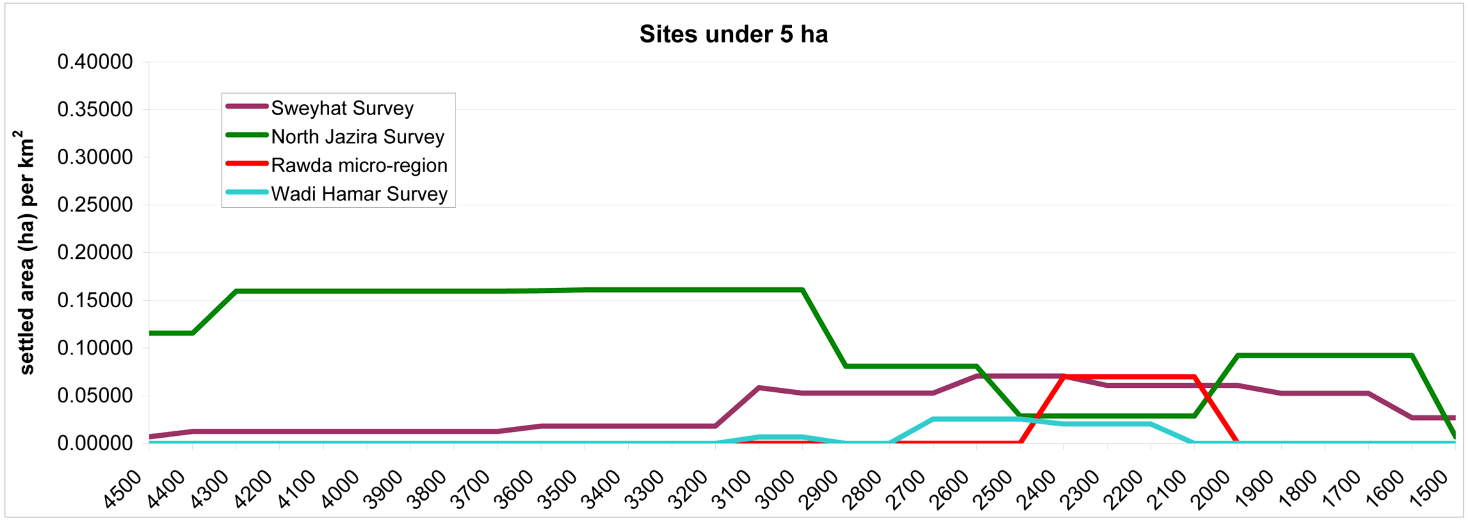
The Shamiya: the Mission des Marges Arides – *Rawda micro-region*

Around 100 km southwest of the GWJ, the survey of the *Mission des Marges Arides*, conducted under the direction of Bernard Geyer initially in 1995-2002, covers an area of over 7000 km^2 south of Aleppo and northeast of Hama (Geyer *et al.* 2007). Near to 1000 sites were identified in the entire region; however, for the purposes of this comparison, a subset of 100 km^2 around the major fortified site of Tell al-Rawda was selected. This area (amongst others) was systematically revisited in 2006 and its sites located and dated with greater precision than had been possible before (Castel *et al.* 2008: 39). Though the final publication of the Rawda project (including on the excavations at the site itself) is still forthcoming, preliminary data (Barge *et al.* 2014; Castel & Peltenburg 2007; Castel *et al.* 2008: 36-41; Geyer *et al.* 2007) is sufficient to accurately compare the dynamics of this region. The survey area comprises an undulating steppe traversed by a couple of major seasonal wadis, with Tell al-Rawda located in a flat valley bottom with fertile silty soils known locally as a *fayda* (Barge *et al.* 175-177). Despite a relatively low rainfall of less than 250 mm per year, placing the region within the more arid parts of the *zone of uncertainty* (comparable with much if the GWJ), the *faydas* provide possibilities for rain-fed cultivation (Geyer *et al.* 2007: 270). Following low levels of occupation that are nevertheless evenly spread into the arid steppe during the PPNB, there is an almost complete absence of sites during the Halaf, Ubaid, and LC periods, which the investigators found difficult to explain (*ibidem*: 275). However, this chimes in with much of the negative data from the similar environment of the GWJ, albeit with greater extremity.

The subsequent EBA initially continues this paucity of sites; however this changes in the second half of the 3rd millennium BC, when a wide range of numerous settlements and other sites emerged across the entire region of the *Mission des Marges Arides*, including probably the construction of the *Très Long Mur*, a more than 200 km long boundary wall running roughly northeast-southwest some 10 km beyond the easternmost limits of late EBA occupation (Geyer *et al.* 2010). In the Rawda micro-region specifically, more than 20 sites with likely perennial settlement (some fortified) were established, including the 16-hectare Tell al-Rawda (first occupied ca. 2400 BC), surrounded by four lines of defensive ramparts operating simultaneously (Castel & Peltenburg 2007; Barge *et al.* 2014: 280-281). Such a morphology does not classify al-Rawda as a two-tiered fortified tell, as it lacks a clear "upper town" and "lower town", however this may have much to do with its brief occupation period. The permanent settlements in its hinterland form a three-tiered hierarchy with al-Rawda being the only settlement at its top, and are all clustered 10 km or more west of the *Très Long Mur*, a buffer that is also kept by other late-EBA settlement in the greater region (*ibidem*: 180-182; Castel *et al.* 2008: 39-41). This period of occupation comes to an end by the very late 3rd millennium BC, with almost no material in the survey dating to the early MBA. Settlement picks up again during the mid-MBA, however at a lower density and not extending as far east into the more arid landscape (Barge *et al.* 2014). The settlement pattern of the Shamiya is therefore somewhat similar to that of the Jebel Abd al-Aziz region, with a movement of people into the region and the establishment of major fortified settlements during the mid-EBA. However, the absence of even small sites prior to this period, and the condensed timeframe of its late EBA occupation, are major differences, and likely also led to the observed morphological site variations.

Settlement patterns and economies in comparison

The settlement dynamics of the three regions discussed above can be used to inform not only hypotheses on the EBA economies of those areas, but by comparison shed further light on dynamics at work in the GWJ. The Rawda micro-region, as the area most akin to the GWJ, shows a great similarity to the Wadi Hamar Survey in the boom-and-bust nature of both small and large sites (Fig. 5.23). Though the Shamiya region was likely not completely devoid of pastoralists prior to the mid-EBA, the rapid establishment of



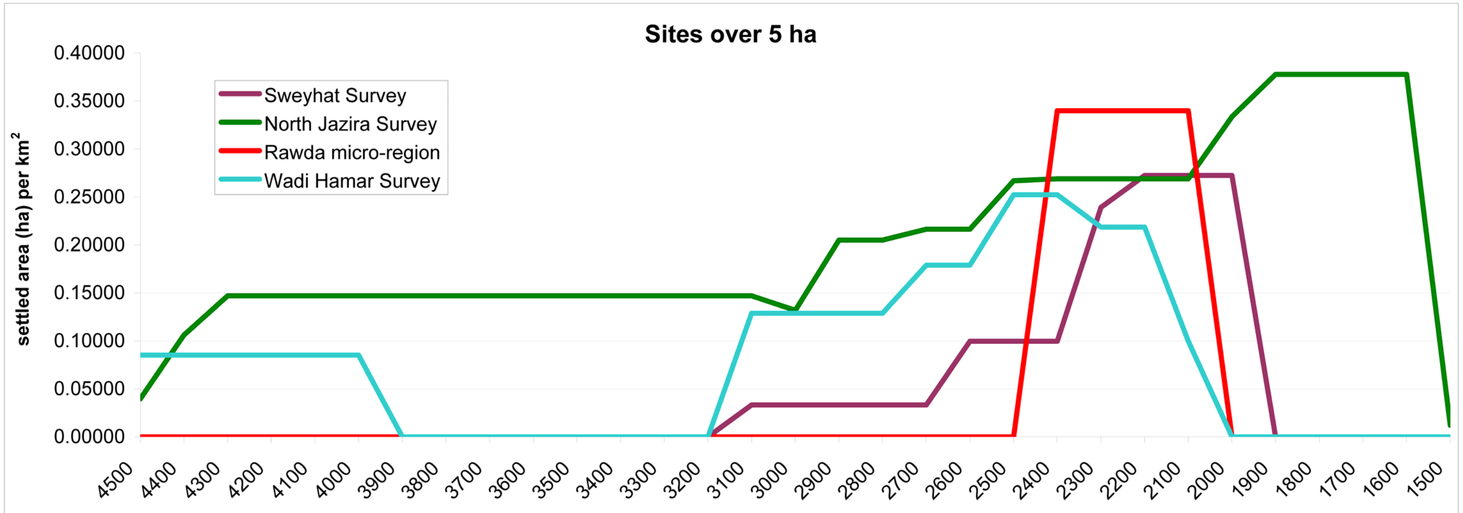


Figure 5.23: Comparative graphs showing settlement densities in the LC-EBA across different survey areas of a) sites under 5 ha, and b) sites over 5 ha. The Rawda micro-region and Wadi Hamar Survey data should be considered rough estimates only (data collated from my research, the Fragile Crescent Project database, and Castel *et al.* 2008: 39-41).

widespread settlement, including fortified sites, indicates a migration into the region from the west; especially as clear material culture connections with the Orontes valley, Qatna, and Ebla exist (Castel & Peltenburg 2007: 610-612). Additionally, the construction of the *Très Long Mur* speaks for a planned incursion into the semi-arid steppe. Since this wall was not fortified enough to have had a defensive function, it most likely served as a boundary marker to nomads beyond, potentially of pastureland desirable to a large regional centre (Geyer *et al.* 2010: 67-69). Specifically, the 10 km internal "buffer" space between the easternmost EBA sites and the *Très Long Mur* could have been used for pastoral practices. This, Barge *et al.* (2014: 180-183) argue, may have been due to the need for vast pasturelands by Ebla during the late 3rd millennium BC, a model also used to explain patterns in the GWJ – though based on a different as yet unknown regional polity (Section 2.2.2). If this was indeed the case, and with Tell al-Rawda having been constructed "as if from a blueprint […] derived from the earliest [examples …] of this ideal city type with radial and concentric streets" (Castel & Peltenburg 2007: 611-612), then the early EBA settlement dynamics of the GWJ may have been an influence. This would certainly account not only for the similarities between the nature of EBA settlement in the two locations, but also the delayed occupation of the Shamiya, with the arid steppe only being ventured into once the possibility of doing so had been established elsewhere.

EBA settlement in the Sweyhat Survey area commences much earlier at the end of the 4th millennium BC, with a slight growth of small settlements from the low levels of the LC. This appears to occur independently of the establishment and expansion of its major centres (Fig. 5.23; Lawrence 2012: 160-161). On the one hand this indicates a high degree of stability of smaller sites compared to larger ones; on the other it suggests a movement of people into this area that populated larger sites rather than simply a reorganisation of the settled landscape (*ibidem*: 166-167). This strong similarity with the origin, though not the overall pattern, of the large EBA settlements in the Wadi Hamar region (and GWJ in general) is perhaps surprising, as the presence of a perennial reliable source of water in the form of the Euphrates river might suggest such a region to be exempt from the boom-and-bust nature of subsistence in the *zone of uncertainty*. However, circumstantial evidence suggests that irrigation agriculture might not have played a large role in the local economy, with the Euphrates "[exhibiting] high, poorly timed floods [which were] difficult to control" (Wilkinson 2004: 38-40). Moreover, such irrigation would only have benefited settlements directly on the river's floodplain, where very few of only the smaller surveyed sites were identified (Lawrence 2012: 163-164). Therefore rain-fed agriculture, together with risk-minimising strategies such as extensification, would have been the primary source of crops, while the economy would have been dominated by the site's position as a focal point for trade routes, and likely supplemented by pastoralism in the Euphrates-Balikh uplands (Danti 2000: 261-265; Wilkinson 2004: 40-51, 186-187). Thus it is interesting to note that although there is doubtless greater stability of settlement along the Middle Euphrates than in the steppe, the difference is not as stark as might be supposed. It follows, then, that a movement into the steppe by populations ordinarily sedentary along rivers, but within the *zone of uncertainty*, was perhaps an only moderately difficult venture, with some of the knowledge of how to cope with unreliable precipitation already learnt. It further could be taken as slight evidence to corroborate the theory that the establishers of urban EBA settlements in the Wadi Hamar area originated from the Upper Euphrates (in the fertile *zone of stable settlement*), as the late EJZ 1 "crisis" period suggests an initial attempt at largely agricultural subsistence unsuited to the semi-arid environment, presumably due to ignorance of practices necessary for the *zone of uncertainty* (see Hempelmann 2013: 273-273; Sections 2.1.4.7, 2.2.2).

The North Jazira Survey, by contrast, offers a truly different settlement pattern to any of the areas in the *zone of uncertainty*. As is well illustrated in Figure 5.23, the simultaneous decrease of small settlements and increase of large ones, along with the existence of a significant number of sites of all sizes throughout the LC, indicates a consistency of sedentism not seen outside the *zone of stable settlement*. This is naturally due to the higher levels of precipitation in the region, which, as is evident from the settlement patterns of the Sweyhat Survey (see above), contribute more to the stability of human habitation than does the presence of perennial rivers. However, the North Jazira Survey area was not one of static settlement, with the large growth of Tell al-Hawa and significant reorganisation of the inhabited landscape being major upheavals. Whether as a by-product of the urbanisation process or a deliberate desire to open up landscape, the abandonment of the southwestern half of the surveyed area would have provided a large amount of pastureland for the clustered settlements (as well as the 103-hectare Tell Hamoukar, 20 km to the northwest; Fig. 1.4), while agriculture around these intensified (Wilkinson & Tucker 1995: 88; Wilkinson *et al.* 2014: 64-66). The availability of this land for sheep grazing, whether by accident or design, would have provided a welcome profitable bonus to the local economy, albeit not of a crucial nature like for settlements in the GWJ. This practice in such a "core" region (see Section 5.4.2.1) may have demonstrated the benefits of exploiting large pastureland areas, possibly helping to spur on other inhabitants of the *zone of stable settlement* to seek such space in the *zone of uncertainty*. Thus, as with the economic needs and practices of all these regions, the northeastern Jazira also informed and was informed by areas in its vicinity, being not isolated but part of a regional network of settlement and subsistence strategies.

5.4.1.2. Further Afield: The Southern Levant – Northern Badia

Looking beyond the immediate vicinities of the GWJ, two geographic locations of similar precipitation levels present themselves. One is Southern Mesopotamia, a region which however features a completely dissimilar environment, with the Euphrates and Tigris rivers, their numerous tributaries, and the large number of constructed irrigation systems creating a landscape that is a far cry from semi-arid steppe land (Hritz & Wilkinson 2006). The other is the southern Levant (Fig. 5.24), where the flat, somewhat undulating steppes match those of the GWJ, albeit comprising different geology and often greater aridity. This region has long been studied separately from Northern Mesopotamia, especially when it comes to the LC and EBA, which has resulted in separate conclusions drawn from the well-documented variances in the cultures present without much of a deeper look at potential equivalences (Prag 2009: 81-82). Thus a need for greater integration between the two regions additionally makes the southern Levant an important comparative area to the GWJ.

Overall, most early-mid LC settlement in the southern Levant was located in the Jordan River valley, where settlements as large as 10 ha developed (Wilkinson *et al.* 2014: 86-92). However, a substantial number of sites have more recently been dated to this period in the uplands east of the Jordan, none of which are particularly large or show evidence of settlement hierarchies. Following this, several short-lived large settlements appear during the late LC-early EBA transition. Along the northern river valleys, these were occupied for 300-350 years and reached up to 35 ha in size. Such settlement was not restricted to the lowlands, however, as this period also saw the establishment of sites in the arid steppe to the east which were even shorter-lived (see below). The early EBA proper saw a large number of often heavily-fortified medium-sized sites spread across much of the region east of the lowland river valleys and into the fringes of arid zones (*ibidem*). Several of these were located within the *zone of uncertainty* and likely practiced intensive agriculture within the narrow band of semi-arid steppe (see Fig. 5.24).

Far east of these sites, in a region receiving at most 100 mm annual precipitation (and thus well within the *zone of aridity*), the Jawa Hinterland Project, under the direction of Bernd Müller-Neuhof, has uncovered evidence of sedentary occupation utilising a variety of coping strategies to subsist in this environment (Müller-Neuhof 2014a, 2014b). This region, the northern Badia, is divided into two main geographic zones: the Hamad, a

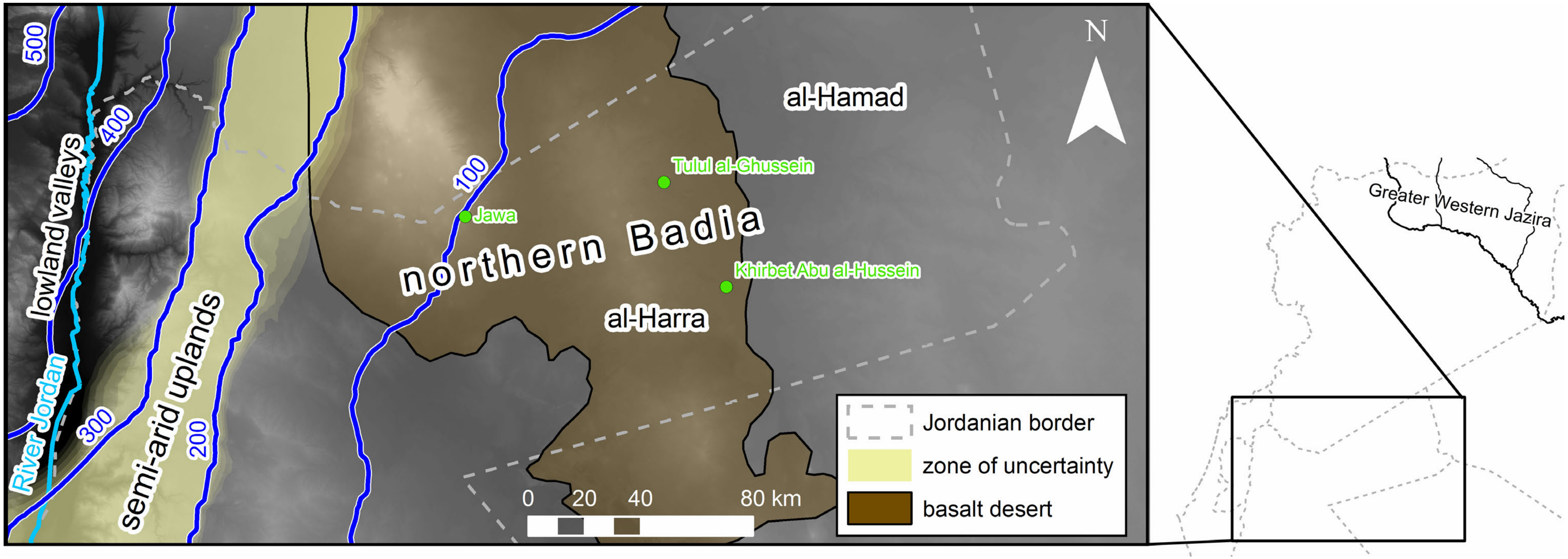


Figure 5.24: ASTER map showing the location of the southern Levant and comparative regions and sites discussed.

mostly flat limestone arid steppe or desert akin to much of the southern half of the GWJ; and the Harra, a region covered in dense basalt boulders, limiting travel to specific access routes such as wadi systems (Müller-Neuhof 2014a: 231-232; Fig. 5.24). The site of Jawa itself, excavated between 1972 and 1986 under the direction of Svend Helms (Betts [ed.] 1991), is situated on the edge of the Harra, and comprises a settlement with visible compartmentalised structures surrounded by a complex of terraced gardens encompassing a combined 33 ha. These stone-walled "gardens" are attached to an irrigation system designed to harvest rainwater from nearby hilltops and local seasonal catchment wadis, directing surface runoff by channels and deflection dams into the upper gardens, from which lower gardens would in turn be watered (Müller-Neuhof 2014b: 188-194). Similar installations have been identified much further east at Tulul al-Ghussein and Khirbet Abu al-Hussein, the latter of which in particular features enclosures that bear a striking similarity to a handful of sites identified in the far south of the Western Jazira (Section 4.5.4). Meanwhile, Müller-Neuhof (2014a: 240-244) identifies a strong correlation between the architecture at these settlements and sites in the Sinai and Negev, which he interprets as evidence for cultural relations between those regions and the northern Badia. While the discovery of similar structures in the GWJ by no means negates this possibility, it perhaps calls for a re-thinking of whether the presence of equivalent site morphologies in climatically and topographically similar environments necessarily indicates cultural connections.

It is evident that an abundant amount of planning and organisation went into this exploitation of the arid Badia region; to an extent similarly to the decisive exploitation of the GWJ, though pre-dating it somewhat. However, it appears that a much greater amount of preparation (based on a seemingly good prior knowledge of the conditions that would be met) took place in the northern Badia (Müller-Neuhof 2014a: 245-247). Furthermore, with its surplus-oriented economy, designed to be part of local exchange (with nomadic pastoralists) and regional trade, this region has more in common with the southern sites of the GWJ such as those along the "Malhat line". Müller-Neuhof's (2014a: 247) proposal that risk-managing strategies in the northern Badia would have been shared, and distributed among specialists in a large social "kinship" entity, is also a practice that could have aided the subsistence of sites in the *southern sector* of the GWJ, including both its two-tiered fortified tells and the Jawa-like sites further south.

Settlement at Jawa and its hinterland appears to have collapsed a mere couple of centuries after its initial founding, with little evidence of occupation later than the early 3rd millennium BC until the early MBA (Helms 1991: 11-18). In the remainder of the southern

Levant, settlement in the semi-arid uplands continued slightly longer. Large fortified sites across the region became abandoned by 2500-2400 BC, representing a significant upheaval that pre-dates any "settlement collapse" in Northern Mesopotamia by several centuries (Wilkinson *et al.* 2014: 90-92). Though reduced rainfall may have set off this event, this would have been experienced by inhabitants of the Northern Mesopotamian steppes also. However, the extremely narrow band of the *zone of uncertainty* in the southern Levant, measuring at most 45 km across (compared with 120 km in the GWJ), meant that while most of it had been occupied by walled settlements in the early 3rd millennium BC, there was not much landscape available for ideal agro-pastoral exploitation in more arid conditions; resulting in less of an economic buffer (*ibidem*: 86-92; Fig. 5.24). This theory is further corroborated by the fact that only small agro-pastoral settlements located on major perennial wadis continued to be inhabited later than the mid-3rd millennium in the upland steppe. Hence the crucial importance of a full exploitation of the *zone of uncertainty* and the agro-pastoral strategies this promotes for enabling long-term settlement in "marginal" regions is again emphasised.

5.4.2. Cores and Peripheries: A Model for "Marginal" Regions

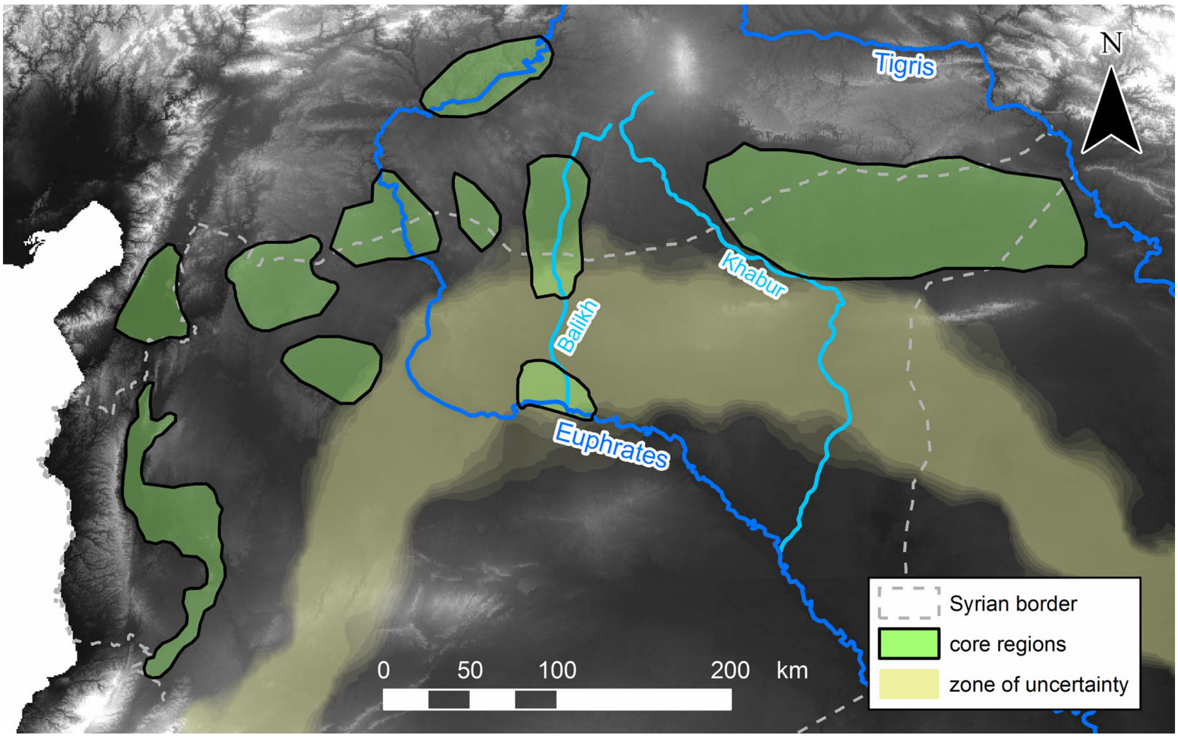


Figure 5.25: ASTER map showing the locations of identified core regions of settlement in Northern Mesopotamia (based on Wilkinson *et al.* 2014: Fig. 17).

The "cores and peripheries" theory is a model based on the specifics of settlement dynamics in Northern Mesopotamia that allows for a contextualisation of findings from the late 5th-3rd millennia BC without losing sight of the archaeology in question. This was developed from the concepts of Guillermo Algaze (1999), relating to the core region of the Upper Euphrates during the LC-EBA, and data from numerous surveys across the region by Lawrence (2012: 284-310, see also 30-32 for a broader overview); later summarised in a wider context by Wilkinson *et al.* (2014: 82-84). By examining the processes proposed by this model with specific reference to the GWJ and the findings of this study, a framework for the reconstruction of LC-EBA settlement in that region is developed. Such a reconstruction subsequently presented in Chapter 6.

5.4.2.1. Characterising Core Regions

Across Northern Mesopotamia, a number of regions of core human occupation can be identified (Fig. 5.25). These are characterised by long-term stable settlement that manifests as a network of medium-sized tells that formed local hubs by the LC; centres which developed and grew slowly over millennia. These proto-urban settlements were supported by closely-packed networks of small settlements, whose densities have been shown to be proportional to the size of each local centre (Lawrence & Wilkinson 2015: 329-333). Furthermore, many of these regions saw significant occupation by the Uruk expansion period, such as the Khabur basin and the Middle Euphrates, where several “Uruk enclaves” formed on the periphery of core settlement. This dense distribution of sites during the LC, a stark contrast to the observed pattern in the steppe, cements an archaeological understanding of the separation between the *zone of stable settlement* and the *zone of uncertainty* in Northern Mesopotamia, which are therefore not merely identified by their econoclimatic definitions (Wilkinson *et al.* 2014: 75-80).

Despite these core regions being areas of settlement stability, many saw significant changes occur in their socio-economic landscapes by the mid-EBA. A reorganisation of settlement around several LC hubs (such as Tells Leilan, Hamoukar, and al-Hawa) saw a reduction in settlement density as large numbers of villages gave way to moderate numbers of towns. This was likely stimulated by the simultaneous massive growth of former LC hubs (Tell Hamoukar, for example, grows from 15 ha to around 100 ha), which often expanded beyond their original mounds into irregular lower towns that appear distinctly unplanned, forming “citadel cities” (Oppenheim 1964: 130-132; Wilkinson *et al.* 2014: 80-83). This new settlement dynamic introduced a clear hierarchy to the core regions, with the newly-formed towns becoming second-order sites, and the remaining villages tertiary ones. A substantial number of the latter continued to survive regardless of the EBA upheaval, with some exhibiting a remarkable longevity of several millennia from the LC to the end of the Iron Age (Lawrence 2012: 305-308). Throughout this process, the overall density of settled area remains almost completely unchanged (*ibidem*: 291-292).

Thus it is evident that the EBA had a profound effect on Northern Mesopotamian regions in the *zone of stable settlement* as much as it did on the *zone of uncertainty*. This model as interpreted by Wilkinson *et al.* (2014: 82-83) posits the commodification of wool produce during the EBA, a significant factor in driving migration to the GWJ, to have likely precipitated settlement change in core regions also. This, in turn, would have caused a need for pastureland as has been theorised for the northeastern Jazira (Section 5.4.1.1), with the opening up of space for grazing large herds necessitating the clustering of populations into fewer larger sites. Such an economic impetus would help explain the extremely large settlement sizes of several core-region EBA centres (e.g. Tell Hamoukar: 103 ha; Tell Mozan: ca. 120 ha; Tell Chanafes: 141 ha); larger than any of the two-tiered fortified tells of the steppe. With the exception of the northeastern Jazira, this process did not generally occur at the outset of the 3rd millennium BC, however, with the majority of settlement restructuring commencing around 2600 BC (Wilkinson *et al.* 2014: 80, 82). Thus this relates chronologically to the establishment of large urban centres in the Jebel Abd al-Aziz region, but substantially post-dates this development in the Wadi Hamar area. This suggests that further processes, or at least a modification of this model, may better explain the cause of the EJZ 0 settlement explosion around Tell Chuera.

5.4.2.2. Effects on the *Zone of Uncertainty*

While the above model has little to say on the "peripheries" of Northern Mesopotamia during the LC, it can be applied to a variety of EBA patterns across much of the *zone of uncertainty*. The large-scale increase in sites of all sizes (including large two-tiered fortified tells) and the establishment of a moderately dense hierarchical settlement network in these regions, it is argued, resulted from the same causes that were responsible for the reorganisation of the settled landscape in core areas: a desire for vast pasturelands to accommodate large economically profitable herds in the wake of the shift from flax to wool as the major component of textile production (McCorriston 1997; Smith *et al.* 2014: 166-168). Such lands could be found in abundance in the semi-arid steppe, a niche area that would have been able to support a large increase in sheep holdings even in the absence of particularly favourable climatic conditions (see Section 2.2.2). Much of this landscape was presumably formally unclaimed by sedentarists prior to the EBA, and so open for the taking. Thus roughly concomitantly with the reorganisation of settlement in core areas, a large-scale movement of people from these into regions with lower levels of precipitation with the concerted purpose of exploiting its pastoral reserves is theorised to have taken place, explaining both the extensive settlement and the boom-and-bust nature of its dynamics (Wilkinson *et al.* 2014: 82-84). Under such a system, the large centres (such as two-tiered fortified tells) that sprung up in the marginal regions would have been nodes which managed pastoral activities in their hinterlands, as well as often being a part of long-distance economic networks. Such a model is not solely applicable to the steppe either, as areas within the *zone of uncertainty* along river valleys (such as the Sweyhat region as discussed in Section 5.4.1.1) also see a similar growth.

By positing such a movement of people, a model that fits the archaeological evidence from various regions of the *zone of uncertainty*, the question is raised of why what would probably have been perceived as a "hostile" environment was selected for habitation by populations living in core regions. Porter (2004) argues that ancestor-based belief systems centred around a shared sense of space would have kept a notion of kinship with pastureland locations used by sedentary societies' predecessors. Building on this concept, Wilkinson *et al.* (2014: 83) suggest that, based on the admittedly sparse evidence of the Syrian steppe having been used as temporary grazing grounds by sedentary communities prior to the 3rd millennium BC, ties and perhaps claims to this land would have continued into the EBA. For the GWJ, the concept that its landscape was known to the establishers of sites in the Wadi Hamar region prior to the EBA was discussed with a generally positive consensus at the "House and Household Economies in 3rd millennium Syro-Mesopotamia" workshop at the Goethe-Universität Frankfurt am Main in October 2012. In this case, an established connection of migrants with the region they moved into (during EJZ 0) additionally addresses the problem of prior ownership. Unlike in the probably truly "unclaimed" Jebel Abd al-Aziz area, large sections of the Wadi Hamar, with its evidence of moderate LC 1-3 occupation including at least one potential medium-to-large centre at Tell Chuera, would under this model no doubt already have had ancestral-space connections with certain communities. This issue would have been significantly lessened, however, if the populations occupying the region at the start of the EBA were either descendents of those that had lived there during the early LC, or had more recently been using the landscape intermittently for grazing purposes, creating a newer, more powerful claim. Thus this aspect of the "cores and peripheries" model, while highly theoretical, effectively offsets several issues incurred by the migration hypothesis for EBA settlement in the steppe.

Then again, the perceived or real dangers of venturing into the *zone of uncertainty* may well have been offset purely by the lure of the potential economic gains it had to offer. As touched on in Section 1.3, the co-evolutionary spiral of agro-pastoralist practices, together with potential opportunistic stocking of economic goods (in this case large herds and fodder crops), fits into the "cores and peripheries" model as a mechanism for survival in the semi-arid steppe (Wilkinson *et al.* 2014: 83-84). The planned implementation of such a system suggests a perception of "marginal" landscapes as an immediate economic supply rather than a resource to be nurtured long-term (Smith *et al.* 2014: 158-159). Such a concept of pastoral landscapes is not confined to Mesopotamia; parallels can be found in semi-arid regions of West Africa, where it has been observed that, in disregard of a landscape's "carrying capacity", local peoples allow livestock numbers to increase rapidly during climatically favourable years and expectedly bear the losses of these plummeting during times of greater aridity; an "uncertainty-as-norm" system (Mortimore 1998: 63-66, 72). For example, in one instance in 1984, a severe drought halved the cattle population across the region; however, it took only five years for numbers to return to their original levels (*ibidem*: 68). This suggests the possibility that the risks involved in exploiting regions such as the GWJ, though acutely present, could be overcome within a timeframe acceptable to established economies, especially by large polities which could absorb losses when necessary (see Section 2.2.2).

Nevertheless, it is clear that regardless of the general effectiveness of risk-managing techniques employed in the Northern Mesopotamian *zone of uncertainty*, an eventual withdrawal from those areas took place by the end of the EBA. Lawrence (2012: 300-302) argues against a mono-causal explanation for this, citing possible contributing factors as being the Akkadian invasion of around 2300 BC, an abrupt climate change event, and a replacement of sedentary populations by nomadic pastoralists who left no trace in the archaeological record. While a general aridification towards the end of the 3rd millennium BC was doubtless a real factor (see Section 1.2.3), the asynchronous abandonment of different regions within the *zone of uncertainty* speaks against this being its main immediate cause. For the Jebel Abd al-Aziz region, Kouchoukos (1998: 436-437; see Section 2.1.4.5) has previously put forward the idea of climatic changes as an underlying significant factor in its abandonment, but the Akkadian expansion as the direct catalyst. This could help explain the EJZ 3b/4a abandonment of the *central* and *southern sectors* of the GWJ, but continued occupation until the end of EJZ 4c (up to two centuries later) in the *northern sector*: though climatic conditions eventually precipitated an abandonment of sites across the board, the Akkadian invasion sped up this process as it spread northwards. Furthermore, the gradual decline of sites like Tell Chuera over a century or so suggests a premeditated, if not entirely voluntary, withdrawal based on a reasoned response to unfavourable conditions and poor economic returns rather than a frantic “collapse” of a system. The same may be true of the Shamiya, where the Akkadian expansion had little influence, and settlement remained until ca. 2000 BC (Castel & Peltenburg 2007: 606; Lawrence 2012: 300).

The third possible co-existent explanation cited by Lawrence, regarding a resurgence of nomadic pastoralism in the region, is rather problematic. Though a co-directional transition between sedentism and nomadism, shifting as local conditions dictated, has been widely documented, for example in the Yomut Turkmen tribes of the Gorgan region in northeastern Iran, these systems always comprise small, often merely seasonal villages in their settled states (Salzman 2002: 254-255). I would contend that this causes the model to not directly apply to certain regions of EBA Northern Mesopotamia, such as the GWJ, where highly urbanised sedentism lasted consistently for several centuries. Following such a period, it is unlikely that these communities could have easily adapted to a mobile lifestyle and economy in the absence of any substantial knowledge of the practices necessary for subsistence in a nomadic system. Conversely, if we assume the proposed mobile pastoralists to have been different peoples from those occupying EBA sites, then they had likely consistently existed throughout much of the *zone of uncertainty* alongside the latter during the EBA (see Section 5.2.4.3); thus their continued remaining in the steppe hardly constitutes a “replacement” of the settled inhabitants. Furthermore, the entire sedentary population of the *zone of uncertainty* did not necessarily respond to the pressures that led to the abandonment of its settlements in the same manner. In their analysis of the disappearance of sites from the archaeological record between the Bronze Age and early Iron Age in the Southern Ural-Kazakhstan steppes (likely caused by general aridification), Nikolai Vinogradov and Andrej Epimakhov (2000) propose that the “scheme of transition was not equal for the entire […] population”, and that while some inhabitants of the region may well have switched to nomadism as a coping mechanism, others continued their sedentary lifestyles by moving to more reliable water sources. Thus while a shift to nomadism is a factor that needs to be considered for the Northern Mesopotamian steppes, it should not be viewed as an exclusive explanation; and its specific application to the end of the EBA in the GWJ, at least, is doubtful.

Chapter 6
Conclusions

Section 6.1: The Development of Settlement in the late 5th to 3rd Millennium BC Greater Western Jazira in its Wider Historical Context

Tying together the analyses and discussions conducted in Chapter 5, it is possible to hypothesise a reconstruction of the dynamics and processes at work in the GWJ during the LC and EBA in relation to the wider region; using the geographical framework of the settlement sectors laid out in Section 5.2.1 (Fig. 5.1). The events and motivations affecting human settlement in the GWJ during the late 5th-3rd millennium BC listed below are well supported by the data collected by this thesis, and therefore minimally speculative within the boundaries of the current state of research. As the latter is liable to change in the future, however, so will the interpretations made from it; thus this should be considered a work in progress. The following narrative runs chronologically, but does not cover every single time period, instead focussing only on those of significant changes in human dynamics. Furthermore, the dates in brackets relate to the most likely time periods in which the events described took place, and should not be taken as accurate ranges for the phases listed (for this, see Section 2.3). Lastly, this is not an attempt to explain or incorporate every observable settlement pattern in the GWJ, but instead to focus on the big picture of regional developments.

LC 1-3 (ca. 4500-3700 BC)

From the mid-5th millennium BC, a number of very small settlements dotted the largely empty landscape of the *central* and *southern sectors*. These probably developed by the same process as did the patchwork of sites across Northern Mesopotamia, which at this time comprised numerous small communally-oriented settlements with no clear signs of status or centralised leadership (Ur 2010b: 393-401). This is reflected in the GWJ by the fairly uniform very small sizes of the majority of late Ubaid/early LC sites, with no clear settlement hierarchies. However, the majority of the steppe, if it was inhabited at all, would have been largely the domain of nomads who probably had no or only minor interactions with settled populations on its fringes. This is because the desire by sedentarists for exchange with pastoralists would have been low at the time, as the use of flax, rather than wool, for textile production prior to the mid-4th millennium “fibre revolution” (McCorriston 1997) meant the pastoral returns offered by the limited possible numbers of sheep and goat holdings in fertile core regions were sufficient.

The only area of the GWJ that saw the growth of larger settlements was the *northern sector*, where several medium-sized tells were established on the sites of previous small Ubaid settlements. During this period, a few large urban centres such as Tell Brak, Tell Hammam al-Turkman, and Khirbet al-Fukhar (Tell Hamoukar's "southern extension") developed in Northern Mesopotamia. This resulted in monumental architecture, craft specialisation, ceramic production technology, glyptic repertoire, and an increased social complexity similar to that found contemporaneously in Southern Mesopotamia, leading Pascal Butterlin (2003) to term it the "*époque proto-urbaine*" (see also Algaze 2007; Lawrence & Wilkinson 2015: 329-333). The largest GWJ site of the time, Tell Chuera, can be considered a further representation of such centres, though not enough of it has been excavated to be sure of anything other than a significant size during the early LC; possibly upwards of 25 ha (Helms & Tamm 2014: 287-288; Meyer, pers. comm. 10/04/2013). This is comparable with the contemporaneous sizes of Tell al-Hawa (33-50 ha; Wilkinson & Tucker 1995: 44) and Samsat (10-17 ha; Lawrence 2012: 122). As with the other centres of the time (see e.g. Algaze 1999; Wilkinson & Tucker 1995: Fig. 35 [top]), the site was probably surrounded by a "corona" of uniformly small villages or hamlets at a certain distance, one of which would have been Tell Tawila. It is also possible that Tell Chuera saw short phases of abandonment during this period when only the smaller sites in its vicinity were inhabited; a "pulsating urbanisation" dynamic evidenced elsewhere in the region (Lawrence & Wilkinson 2015: 340).

Despite the greater "friction" of overland transport in Northern Mesopotamia compared to the ease of fluvial routes in the south (Algaze 2008: 145-146), a modicum of long-distance trade, supplementing and increasing stability of a predominantly agricultural economy, is apparent at many LC centres in the region (e.g. Stein 2012: 136). The material culture similarities with and vicinity of Tell Hammam al-Turkman (43 km) make this a likely candidate for strong interaction with the *northern sector* of the GWJ (Babour in Hempelmann 2013: 35-36; Dohmann-Pfälzner & Pfälzner 2002: 12 fn. 28). Whether an early LC centre existed in the Balikh-Qaramukh plains is not clear; however one potential candidate does exist: the up to 50 ha Tell Hajib (which certainly saw late LC occupation; Einwag 1993: 34), a further 68 km from Hammam al-Turkman. Though the density of these definite and potential centres is markedly lower than that of distributions in Southern Mesopotamia, it calls into question the idea that all large LC settlements in Northern Mesopotamia were "separated from each other by hundreds of kilometres… [and] largely isolated from one another in terms of day-to-day contacts" (Algaze 2008: 120). Thus trading coupled with economic competition with these relatively close-by sites may have been a major factor in developing the economies of the larger *northern sector* sites, causing them to grow beyond the sizes of locally-focussed villages.

Whether this brief period of urbanisation in the *northern sector* lasted past the end of LC 2 is impossible to determine given the current data. However, the fact that only LC 1-2 material has been found at Tells Chuera and Tawila, coupled with the widespread abandonment of the Balikh valley (presumably their main trading partners) by the start of LC 3, provides circumstantial evidence that it did not. Gil Stein (2012: 139-141) puts this down to a fragmented political landscape caused by growing complexity in the region. Meanwhile, the small settlements of the GWJ, specifically the few in the eastern *central sector*, may have lasted longer, as their proximity to the Khabur, which continued its process of indigenous-driven settlement nucleation, growing social complexity, and political centralisation throughout LC 3 and into LC 4 (Ur 2010b: 395-398), would have provided a continuing support network. However, as these processes are far from clear, and as the dating of settlements to LC 3 based on material culture is inherently uncertain, the 4th millennium abandonment of the GWJ may have occurred simultaneously or asynchronously at any time between ca. 4000 and 3500 BC.

LC 4-5 (ca. 3700-3100 BC)

What is certain is that there is practically no evidence of LC 4 or 5 Uruk material in the GWJ, while positive evidence of a break in occupation exists at Tell Chuera (Babour in Hempelmann 2013: 35-36). This could be attributed to a variety of factors. While some existing urbanised settlements in Northern Mesopotamia continued to flourish during the late LC, social and economic dynamics altered with the arrival of the Uruk expansion. This "informal empire" (Algaze 1993: 110-115) spread from the eponymous site (modern Warka) on the Lower Euphrates, and manifested itself in a variety of ways, including (few) conquered northern settlements such as Hamoukar, trading enclaves at pre-existing sites such as Hacinebi, and colonies established *ex nihilo* such as Tell Sheikh Hassan (Algaze 2008: 68-73; Butterlin 2003: 232-254). Meyer (2010a: 18) considers this to constitute an imposed economic and political system of Southern Mesopotamian urbanism, which created dependency on its "world system"[89] in the centres that remained and thus precluded further local urban developments. However, it is very possible that the Uruk expansion and the late 4th millennium abandonment of the GWJ are not connected, with the majority of the latter having perhaps already occurred at the start of LC 3. Furthermore, the

[89] A concept originally proposed by Algaze (1993); for an overview and summary of criticisms see Butterlin 2003: 98-107.

complete absence of Uruk material, at least in the Western Jazira (but see below), indicates that the steppe was marginal to the economic and political potential of Northern Mesopotamia, as well as being distant from fluvial routes and thus bypassed in favour of regions accessible by riverine transportation (see Butterlin 2003: 351-357). This likely disrupted any remaining support for small settlements in the *central sector* by urban centres along the Balikh or Khabur (perhaps simply due to the better returns available to these by engaging in new economies brought by the Uruk expansion). Thus although a lack of occupation during this period cannot be positively identified due to the uncertainty of local LC 4/5 material culture definitions discussed in Section 2.3.3.1, it seems very likely that *central sector* settlements became abandoned at the outset of LC 4 at the latest.

One clear exception to this is the presence of Uruk material at Tell Hajib in the Sarugh plains of the northern *central sector*. Specifically, the mass-produced bevelled-rim bowls found at the site (Einwag 1993: 34) indicate occupation during LC 5. However, the tell is located on the very periphery of the GWJ, in a region that is not a marginal steppe; hence the theory of that landscape being bypassed still stands. Furthermore, its unusual (for the GWJ) proximity to a dense conglomeration of five major Uruk enclaves along the Middle Euphrates[90], proposed by some to have comprised part of an "Uruk state" in the local area (Butterlin 2003: 346-351), makes a strong connection to this site not unreasonable.

Another factor to be considered is climatic variation. Amongst others, Hempelmann (2013: 271) considers an RCC event occurring around 5200 BP to have caused the LC 4-5 abandonment of the Wadi Hamar area; however evidence for the actual effects of this are inconclusive (see Section 1.2.3). Certainly changes in the local climate are a constant hazard in the *zone of uncertainty*, and even in the absence of an RCC event could have precipitated migration away from an unfavourable region. However, the known regional political and economic factors described above, for which there is far more conclusive evidence than climate change, must at present take precedence in such interpretations. Additionally, if the *northern sector* was indeed abandoned by the start of LC 3, this would be over seven centuries before the supposed "5.2 k BP event".

The probable absence of settlement in the GWJ does not preclude its use as a seasonal pastureland, however. This has been suggested for the Balikh-Euphrates steppe by Danti (2000: 302-306), who contends that Tell Hajji Ibrahim (on the Euphrates; 1 km southeast of Tell al-Sweyhat) comprises a grain-storage site, indicating that seasonal nomadic groups used this for the supplemental feeding of livestock in winter. These would have annually moved into the adjacent steppe for spring pasture, and back again by early summer. In the

[90] Carchemish, Tell Jerablus Tahtani, Jebel Aruda, Tell Sheikh Hassan, and Habuba Kabira.

Euphrates-Balikh *central sector*, this system lasted until the mid-3rd millennium BC. In the *northern sector* such a dynamic, but on a larger scale, may well have existed during LC 4-5 (Section 5.4.2.2), with sedentary communities from the Upper Balikh, Sarugh plain, and potentially Upper Euphrates, possibly the descendants of the early LC occupiers of the steppe, exploiting the *zone of uncertainty* for the seasonal grazing of their herds; thus keeping at least a tenuous socio-cultural link with the region.

Despite this largely empty picture of the GWJ at this time, it is possible that (semi-) permanent settlement existed in the *southern sector*. Though the small circular structures identified there cannot be dated, their resemblance to the late LC structures of the northern Badia opens the possibility of a contemporaneous construction (Section 5.4.1.2). It is thus possible that the desert kites of this region were also constructed during this period, and used by settlers or nomads (or both) to trap gazelle for consumption. This could have been an exploitation of the steppe not merely for absolute economic returns, but for a greater freedom of economic opportunities afforded by mobility in a region not touched by the influence of the Uruk system; an "alternative to the centralizing propensities of the urban elites" (Adams 1978: 334).

EJZ 0 (ca. 3100-3000 BC)

The very outset of the EBA saw the first major urban migration into the GWJ, specifically the *northern sector*. The causes and origins of this are unclear, but much can be extrapolated from the results of this thesis. According to David Anthony (1990), non-forced migration occurs when the a negative "push" factor in populations' homelands meets a positive "pull" of the destination, with acceptable travel costs. As there is little evidence to suggest that a regional power capable of instigating an imposed migration existed in early EBA Northern Mesopotamia (see e.g. Ur 2010b: 401-404), these factors must be considered. The collapse of the Uruk expansion just prior to this time would have removed the foundations of a regionally integrated economy in many urban areas, which local centres had perhaps become reliant on as suggested by Meyer (2010a: 18), leaving only small-scale subsistence economies remaining stable. Thus poor opportunities, which perhaps caused the general settlement trend of Northern Mesopotamia in the early EBA (see below), would have been a significant "push" factor, driving urban populations to seek new regions for economic potential and hence habitation. As access to information on possible destinations is one of the strongest limiting factors to migration (Anthony 1990), likely candidates would have been regions already known to the migrants; and following the hypothesis outlined above, this could apply to a previously seasonally-visited *northern* *sector*. This would also have enabled prospective migrants to observe the potential positive environmental effects of a wetter climate (see Section 1.2.3), which according to Kalayci (2013: Fig. 5.15) caused most of the *northern sector* to be above the 300 mm isohyet (Fig. 1.8) and therefore to become agriculturally viable land. Thus the northern parts of the GWJ could have exerted a powerful positive "pull" effect on nearby populations on the Upper Balikh and Euphrates by offering high-potential economic returns.

The precise origin of the EJZ 0 inhabitants of the *northern sector* remains elusive, however the hypothesis of migrants from the north and northwest proposed by the excavators of Tell Chuera is a very plausible one for a number of reasons discussed in Section 2.2.2. Specifically, Samsat and Kurban Höyük have strongly comparable ceramics (such as *cyma-recta* bowls) to Tell Chuera at this time (Meyer & Hempelmann 2006: 27). The groups that moved into the GWJ would likely have done so independently of the controlling powers of the settlements of origin, which were in any case becoming decentralised at the time (Ur 2010b: 401-404), as to quote Anthony (1990: 908) "it is often only a very narrowly defined, goal-oriented subgroup [of a culture] that migrates". Additionally the internal structure of Tell Chuera during EJZ 0 suggests a lack of rigid control, with new dwellings often disregarding prior street plans and no clear building size pattern in local neighbourhoods (Section 2.1.3.1). This, together with the absence of a palace or central temple from this period, has been suggested by Meyer (2010a) to be evidence for a communally-organised settlement. This was perhaps a precursor to the type of "communal management" of labour, and hence political organisation, evidenced by the later Beydar texts (Sallaberger & Ur 2004: 56-58), which according to Walther Sallaberger and Pruß (2015: 73) "can be taken as a paradigmatic example for early Mesopotamia". These suggest that workforces at Nabada (Tell Beydar) were divided into five separate groups (perhaps along tribal lines), each led by an official who, whilst being subject to the overarching power of Nagar (Tell Brak), possibly formed part of a "city council" (*ibidem*: 118-124). Such units of a tribal origin were likely also the basis of the internal control structures of early EBA sites in the *northern sector* (Meyer 2010a), as evidenced for example by the distinctly separate "town quarters" of Tell Kharab Sayyar at this time (Section 2.1.3.2). The storage structures at this site are additionally evidence for the type of collective granaries mentioned in the Beydar texts.

In the absence of any clear central power at the largest site in the region, it is probable that settlement in the *northern sector* was not directly controlled in an overarching hierarchical system during the early EBA. Instead, Meyer (2010a) proposes initially small independent communal political structures, with each major site controlling its own hinterland and the villages therein; akin to the "province" of Nabada[91] (Milano 2012: 511-512). With the knowledge of urban planning brought from their homelands, migrants constructed monumental architecture such as central squares and massive fortifications, with a single set of large ramparts around each centre for protection against the perceived threat of raids by other polities and nomadic groups. These comprised the later upper towns of *true Kranzhügel* and *Dakhliz-variety* sites such as Tells Chuera, Abu Shakhat, Barabra east, Marrak, and Glai'a. Such organisation does not contradict the theory of a decentralised power structure, as rather than a binary "planned or organic" dichotomy, it is more accurate to consider *degrees* of urban planning for such sites (Lawrence & Wilkinson 2015: 337-339). This manifests as, for example, organised but very heterogeneous city wall construction at Tell Kharab Sayyar, with each "town quarter" apparently in charge of building its own local section (Section 2.1.3.2).

The economy of these sites would have been overwhelmingly agricultural with some pig farming, to which the minimal interaction between centres did not contribute significantly. Additionally, the new migrants clearly took advantage of the opportunities that existed in the steppe for catching wild game, resulting in the high proportions of gazelle remains found at Tell Chuera, which in the EJZ 0 nearly match those of sheep and goat (Tab. 2.2). Pastoral exploitation of the *zone of uncertainty* does not appear to have been the primary goal of the earliest EBA inhabitants of the GWJ. Despite the general shift from flax to wool having occurred throughout Northern Mesopotamia by this time, roughly equal caprid and wild game assemblages (indicating at most moderate pastoral dimensions to economies) are not uncommon at LC sites in Anatolia (Schoop 2014: 427-429), and it can be assumed that such economic systems were imported wholesale to the GWJ. The construction of canals in the *northern sector* could have occurred at any point from this period onward, and was certainly feasible in a non-hierarchical communal management system as evidenced at numerous sites in the central and southern Levant (Braemer *et al.* 2009: 49-54).

Over the course of EJZ 0 and perhaps early EJZ 1, slowly increasing economic and social connections between the major sites of the *northern sector* (Meyer 2010a) created increased competition, resulting in the fairly homogenous material culture observed across the region. Such a structure bears strong similarities to that of Southern Mesopotamia during the Uruk period, with the close proximity of multiple centres (in the Wadi Hamar region, the furthest are 15 km apart [Fig. 5.11]) encouraging regional growth (Algaze 2007, 2008). This represents a peer polity system, in which "imitation and emulation,

[91] Though without the overarching control of a "state" such as Nagar.

competition, warfare, and the exchange of material goods between autonomous… socio-political units which are situated beside or close to each other within a single geographical region [takes place]" (Renfew 1986: 1). This is a major departure from the majority of Northern Mesopotamia at this time, which saw indigenous centres vanish in favour of dispersed small settlements and reduction in social complexity during the Ninevite 5 period (ca. 3000-2600 BC; Ur 2010b: 401-404; Wilkinson 1994). Though a few towns of 15-25 ha do exist (like Tell al-Hawa; Wilkinson & Tucker 1995: 49-50), this does not come close to the agglomeration of up to nine sites measuring 10-25 ha in the northern GWJ. It thus appears that the opportunities afforded by formally unclaimed land for agriculture, a large local food resource in the form of wild game, and independently-managed polities allowed populations in the northern GWJ to keep pre-EBA trajectories of urbanism going long after they had collapsed elsewhere.

Early EJZ 1 (ca. 3000-2950 BC)

As the peer polity system of the *northern sector* became established and its economy grew, the region began to attract new settlers. This saw the founding of many new villages in the Wadi Hamar region, but not much increase in the sizes of existing settlements. As the communities of initial migrants into a new region tend to become controlling leaders[92], the new arrivals were perhaps seen as "others" by the original settlers (even if they originated from the same locations), and hence not incorporated into the habitations present. With the "provinces" of the settlements established in the EJZ 0 controlling the majority of the *northern sector* due to their close proximities, the new villages mostly fell into these units of control. While it might seem strange that populations would choose to migrate to a region where they would have to submit to the control of a pre-existing power, this may still have been favourable to the uncertainties and potential dangers of the largely unadministered, increasingly deurbanised landscape of dispersed villages in the eastern Jazira and Upper Euphrates (Ur 2010b: 401-404); indeed such conditions may have precipitated this "second wave" of migration. Alternatively, the new settlers may have originally wished to take advantage of the pastoral potential of the *zone of uncertainty* through trade with nomadic groups and the raising of larger herds, but were unable to grow economically due to the control of the centres; instead fitting into the pre-existing polity structure. To quote Stephen Batiuk (2013: 450), "groups can migrate for one reason, but can remain and be successful in an area for different reasons". The migrants would

[92] Or at least have the greatest degree of agency to shape the society of the destination region as they desire (see Bakewell *et al.* 2011 for a modern context).

probably have comprised small groups, potentially entire villages, which in the decentralised political climate of Northern Mesopotamia were free agents to move as they pleased.

This process was likely not restricted to the Wadi Hamar area, and probably also saw the foundation of small settlements in the Balikh-Qaramukh plains, where only two existing large centres would have controlled less of the land than the seven in the Wadi Hamar region. This could account for the greater density of villages west of the Balikh.

A second possibility, which may also have occurred in tandem with the above, is the sedentarisation of local nomads. As the economies of the nascent urban centres grew, the desire to reap some benefits from their existence in the steppe could have grown amongst groups that formerly relied on mobile pastoralism alone. Economic competition between nomadic tribes could have further driven this process, spurring on the impetus to maximise profits. The potential existence of longstanding tribal military conflicts may also have made the protection of urban centres, which may have been given in return for exclusive trading rights, desirable. This is not to say that the entire nomadic population of the region settled; indeed some or most of the newly established villages may have been trading camps that liaised between an area's sedentary and mobile inhabitants. Far from constituting a departure from a mobile lifestyle, such small-scale sedentarisation would likely have been considered part of nomadic culture, and indeed a mechanism that enabled it to flourish (see Porter 2004; 2012: 10-14).

Around this time, the *central sector* saw its first permanent settlements established: small communities in the vicinity of the Jebel Abd al-Aziz, the inhabitants of which likely originated from the nearby Khabur valley. With the same "push" factors away from their homeland as described above, the migrants were likely "pulled" to the steppe by the opportunities of exchange with mobile pastoralists, an enterprise recently made lucrative by the commodification of wool (Kouchoukos 1998: 421-423; McCorriston 1997). Similar factors have been suggested to explain the contemporaneous expansion of small and transitory sites into the steppe south of the Euphrates (Nishiaki 2010: 39). Unlike the potential same scenario in the *northern sector* however, these settlers found a completely empty landscape with no control systems in place, and were able to trade with local nomadic tribes without restrictions. Additionally, they likely engaged in low-risk agriculture and herding on a small scale. They also possibly buried their dead under small mounds, which appear clustered in large cemeteries similar to those around Jebel Bishri (Nishiaki 2010: 42-43, with further references).

The establishment of major settlements *ex nihilo* at this time is not limited to the GWJ, however. Despite this period being one of general deurbanisation outside of the steppe (Ur 2010b: 401-404), some new settlements were founded – notably Mari (Ville I). Though it was constructed more than a century after the commencement of urbanism in the GWJ, this large site, with its town planning and fortification walls, is more similar to both the morphology and probable level of regional control of Tell Chuera[93] than that of the contemporaneous small settlements established in the steppe described above (Margueron 2004: 60-67). Situated between the Middle and Lower Euphrates regions (see Fig. 1.4), this site had a significant amount of control over movement, mostly connected to trade, between Northern and Southern Mesopotamia along the Euphrates (*ibidem*). Although this doubtless had effects on the eastern Jazira and Middle Euphrates, its impact upon the largely self-contained settlements in the steppe, in particular the domain of Tell Chuera in the *northern sector*, was likely minimal at this time.

Late EJZ 1 (ca. 2850-2700 BC)

Around a century after the second wave of sedentarisation, a significant crisis event occurred in the *northern sector*. Likely due to a series of multiple successive years of low precipitation occurring by chance, the sedentary economy of the region severely faltered. As the continued absence of abundant percentages of caprid remains indicates large-scale pastoralism was not practiced, the polities of the region had little resilience to such external pressures (Hempelmann 2013: 273-274). Such poor economic returns would have also had a knock-on effect on potential nomadic traders, who likely focussed solely on their habitual pastoralist practices (i.e. a reliable resilient coping mechanism) during this time, decreasing options for trade for urban settlements. Many smaller settlements including Tell Kharab Sayyar, Tell Zaidi, and Mjeddi could not bear the losses incurred and were abandoned, leading to an overall reduction of settled area. This may have constituted a counter-migration to inhabitants' original homelands (see Anthony 1990: 904), particularly those whose ancestors had possibly only recently migrated into the GWJ in the early EJZ 1.

Furthermore, it appears that the effects of this crisis were not limited to the steppe regions. Though a precise date remains to be determined, it is clear that the site of Mari was abandoned for at least a century from around the end of EJZ 1 (Margueron 2004: 90-100). Though not enough of the Ville I has been excavated to be able to archaeologically ascertain the local reasons for this, the contemporaneity of the processes of abandonment

[93] Though Mari's morphology is as yet too uncertain to be included in this thesis' typology of two-tiered fortified tells; see Section 3.6.2.

and reorganisation (see below) in the *northern sector* of the GWJ makes a common cause plausible. Certainly several years of low precipitation could have taken their toll on Mari, which, located in an area receiving ca. 130 mm annual rainfall, relied almost exclusively on the Euphrates for water, including for irrigation by the construction of canals (*ibidem*: 12-47). As even this resource could be highly unreliable in years of drought (Wilkinson 2004: 38-40; see Section 5.4.1.1), the site may well have been abandoned for the same reasons as the tells listed above: an inability to bear the losses of poor crops over a lengthy period of time. As with the settlers of the GWJ, the inhabitants of Mari may also have migrated, or else been forced by circumstance to engage in a pastoral economy that required non-permanent settlement to maintain.

The large fortified tells of the GWJ continued to be occupied despite the crisis, but required major reorganisations. Driven by necessity, more resilient subsistence practices were developed. Perhaps taking their cue from neighbouring nomadic tribes, the sedentary population of the *northern sector* began to specialise in pastoralism and the management of very large herds (resulting in significantly increased caprid remains [Tab. 2.2]); a resource that could be opportunistically stocked so as to not be as severely or rapidly affected by patches of aridity (Smith *et al.* 2014: 158-159). These economic changes were likely implemented alongside the further development of risk-reducing strategies for agriculture, which was still practiced as best possible in tandem, with a focus on whichever was most profitable from year to year (Section 1.3.2). This saw the birth of integrated co-evolutionary agro-pastoralist practices in the GWJ, the success of which extensively affected future settlement in the region.

Within a couple of centuries at most, the crisis was overcome. However, it had lasting effects on the internal structure of Tell Chuera. Land plots for dwellings were apparently newly assigned, with excavations revealing different building orientations compared to earlier periods (Meyer 2010a: 26). Many of these new houses appear to have contained rooms for grain storage, and cylinder seals were found in their contents. Furthermore, there is for the first time evidence of social differentiation, with a range of house sizes, some elaborate rooms, and luxury goods. This all indicates a more hierarchical system, with more powerful groups exercising economic autonomy from the community as a whole – a move away from the communally-organised polity of the type that would later develop at Tell Beydar, which had little space for private enterprise (Sallaberger & Pruß 2015: 114). Instead, Tell Chuera appears to have been on a path towards resembling a “capital” such as Nagar, which was “characterized by a more comprehensive [economic] differentiation” (*ibidem*: 123-124).

Final EJZ 2 (ca. 2600-2550 BC)

By this time, the steady returns provided by well-implemented agro-pastoralist strategies employed by the major centres of the *northern sector* had led to a booming economy and strengthened political structure. This attracted additional migrants and nomads. With evidence for large settlements such as Tells Chuera, Abu Shakhat, Barabra east, Marrak, and Glai'a gradually expanding in area, this sedentarisation probably did not occur in sudden "waves", but over time. This first precipitated the construction of buildings outside sites' existing fortifications. At several of these, the *true Kranzhügel*, this eventually led to the construction of a new city wall to encompass their increased size, with the old wall, now running redundantly through the inside of a settlement, falling into disrepair. At the *Dakhliz-variety* tells, this size expansion was short-lived however, and so no new city wall was ever constructed, with the original wall being kept up instead. Additionally, many new small settlements were established, and some old ones abandoned during the crisis of late EJZ 1, such as Tell Kharab Sayyar, reoccupied.

At Tell Chuera, this expansion is accompanied by further social differentiation, with the formerly public town centre closed off by walls (possibly with checkpoints for security) and the first appearance of a central temple (Hempelmann 2013: 275), bringing the site in line with similar contemporaneous developments at other Northern Mesopotamian sites (Milano 2012: 516-517; Ur 2010b: 407-408). During this period it became a dominant power, with the former peer polity structure of the *northern sector* transforming into a hierarchical one with Tell Chuera at the top (Meyer 2010a: 26-27), akin to the "state" of Nagar (see Milano 2012). If the questionable identification of the site with Abarsal is to be accepted, this would likely be its earliest phase. The hollow way network of the region probably began to form from Final EJZ 2 onwards, as it was the physical manifestations of the subsistence and political economy of a "state" that led to their formation in the eastern Jazira (Sallaberger & Ur 2004: 62).

It is probably during this time that the *Matin-variety* tells of the Balikh-Qaramukh plains were founded. Who exactly constructed these sites is not clear, however the strong morphological differences between them and any of the other two-tiered fortified sites of the *northern sector* leads to the assumption that they were not founded by the same processes as the *true Kranzhügel* and *Dakhliz-variety* tells. Instead, it is plausible that an external polity exerted control over the Balikh-Qaramukh region – possibly Tell Chuera. The hierarchy that such a power would have brought could explain the substantial size gap between primary and secondary sites in the region, as well as the single small mound within all *Matin-variety* tells. Looking to expand their economic outreach, the rulers of

Chuera may first have set up small fortified "trading posts" on the western side of the Balikh, protected against raiders but able to trade with non-hostile local mobile pastoralists. These were in turn attracted to settle (possibly initially only seasonally) near the trading posts, causing their surrounding areas to grow to very large sizes and thus creating the distinctive undulating surface of the tells' "lower towns". As these settlements became permanent, the desire of the local settlers for greater protection led to the construction of outer fortifications also.

Final EJZ 2 is a period when large-scale urbanism in the surrounding "core" regions of Northern Mesopotamia began to catch up with the processes that had been continuing in the *northern sector* since EJZ 0 (Wilkinson 1994). That is not to say that urban growth in the former region was caused by the centres in the steppe, as it appears to have been an indigenous process enabled by the implementation of Southern Mesopotamian social and economic organisation models (Algaze 2007). This led to the growth of many new centres, potentially including the extremely large Tell Chanafes[94]. Conversely, the GWJ appears to have begun to emerge from its isolation of the first half of the EBA, with initial evidence for long-distance trade, primarily with the north and west (Hempelmann 2013: 275). However, it is in the following phase that the "cores" and "peripheries" of Northern Mesopotamia began to interact on a large scale, fundamentally affecting both.

EJZ 3a (ca. 2550-2500 BC)

By far the most significant transformation in the settlement dynamics of the *central* and *southern sectors* occurred in the mid-3rd millennium BC, with a large-scale migration into the region and the establishment of numerous large, often fortified sites. The continued increase of urban and social complexity in Northern Mesopotamia, including the expansion of the regional powers Mari (Ville II) and Ebla, enabled urbanism to be exported to, and possibly imposed upon the populations of, larger sections of the *zone of uncertainty* than ever before. With growing pressure on the hinterlands of large sites to supplement the grain supplies of centres in unfavourable years, agriculture was intensified across the *zone of stable settlement* (Ur 2010b: 405-406). Attracted by a largely empty landscape with opportunities for agricultural extensification without settlement clustering, populations moved into the steppe from adjacent river valleys (Kouchoukos 1998: 421-423).

[94] Despite being a site of great interest, too little is known of Tell Chanafes in its regional context to enable a discussion of it here. From its location, it does not appear to have been part of the polity system of the *northern sector*, however. Furthermore, the internal structure of the 68-hectare Tell Chuera strongly suggests that the site became a "capital" (see next phase), and it is hard to imagine that the 141-hectare Tell Chanafes would have been under its control.

Additionally, desires to exploit the landscape for its pastoral potential played a role, evidenced not only by the fact that wool was a well established commodity by this time, but also by the Beydar texts. These place a great importance on sheep herding, with the *ba-rí udu* ("sheep-watchers") receiving the second highest grain rations in the communally managed labour system of Nabada (Sallaberger & Pruß 2015: 94-98). As a side note, similar impetuses were likely the catalyst for such an incursion into the Shamiya region around the same time (Section 5.4.1.1).

Another major "push" factor that drove this migration may have been the desire of local communities along the Khabur and Euphrates to escape the recently-imposed power structure of the "state" of Nagar, which became dominant in the eastern Jazira region around this time. The control of this polity may well have reduced the opportunities of local enterprise, with philological evidence of tribute being required of communities along the Khabur (Ur 2010b: 408-409). During the late EJZ 3a, the conflict between Mari and Ebla, which resulted in military action in the eastern Jazira and along the Euphrates (Archi & Biga 2003; Meyer 1996: 155-159), likely provided a further impetus for river-based sedentarists to flee to the relative security of the steppe.

These processes saw large settlements with monumental architecture established in the eastern *central sector*; around the Jebel Abd al-Aziz. Based on morphological appearances, at least two of these, Tells Mabtuh Sharqi and Mabtuh Gharbi, were likely initially only inhabited in their later upper towns; with single fortification walls around these. At some point, though it is not clear when, these would have expanded similarly to the *true Kranzhügel* of the *northern sector*. By contrast, the other two-tiered fortified tells of the region (*ringwall settlements* such as Tells Hamam Sharqi, al-Magher, Mu'azzar, and Mityaha) probably saw a simultaneous construction of their inner and outer walls, especially those south of the *jebel*. Most of these sites were constructed on the locations of existing small settlements. This was likely due to the fact that these already occupied the most favourable regions for access to water and arable soils; thus there was not much locational choice for the new settlers but to occupy the same space. The management of these settlements likely followed the communal organisation of Tell Beydar, with strictly controlled agricultural land around seasonal wadi channels. The similar high density of large centres as in the *northern sector* from EJZ 0 suggests a similar peer polity structure, especially as little evidence exists for the involvement of Mari and/or Ebla in the steppe east of the Balikh. While the pastoral land beyond may initially have been shared with existing mobile groups, with whom they also exchanged, sheep herding was likely soon integrated into the urban economies as at Nabada, leaving little room for independent nomads (Pruß & Sallaberger 2003-04: 297-299). These would have either moved on to pastures further west, around the still unclaimed Tual ‘Abah uplands, or integrated, either voluntarily or coercively, into urban living as was likely the case in the *northern sector* (see previous EJZ phases).

At the same time, long-distance trade increased, with routes from the Taurus Mountains, important sources of timber, silver, and precious stones, passing along the Euphrates and Khabur valleys (Kouchoukos 1998: 432-433). Driven by this increased volume of traffic, traders who had previously used routes which hugged river courses saw the opportunity to profitably reduce travel times by cutting across the now no longer uninhabited or unknown southern GWJ. Such a desire was probably also spurred on by the growth of certain sites along the Lower Khabur (such as Tells Asamsani and Sheikh Hamad), the Lower Balikh (e.g. Tell al-Seman), and the Middle Euphrates (e.g. Tells al-Sweyhat, Halawa, and Bi’a), which formed conduits for routes from the east and west and also produced goods to trade themselves. The same is likely true of several of the newly-established sites south of the Jebel Abd al-Aziz, which had the potential to produce considerable grain surpluses. Military movements between Mari and the Euphrates-Balikh steppe (see below) may also have helped to cement new transit routes by cutting across the GWJ, especially as speed would have been a great asset to such troop deployments. These impetuses prompted the founding of several two-tiered fortified tells in the *southern sector*, possibly by opportunistic prior inhabitants of the areas around the *jebel*, who were familiar with the landscape and the dangers befalling trade caravans in a region without a strong centralised controlling “state”. These were constructed at favourable locales likely already used as stopping points by cross-steppe pioneers, providing a protective space primarily for caravans camping for the night *en route* while keeping their permanent inhabitants safe from unknown travellers. Thus the morphology of the *ringwall settlements* developed and spread west, with the founding of sites along the “Malhat line” and its environs. As always, the settlements’ economies were likely not singular, and income from travelling parties in the form of trade or payment for food and accommodation services was no doubt supplemented by agro-pastoralist practices and exchange with local nomads, as well as extortion or protection money against potential raiders (*ibidem*). Additionally, the distribution of risk-management strategies amongst specialists in local kinship groups, as occurred in the northern Badia, may have further ameliorated risk factors for sites in such extreme locations. As routeway sites in the GWJ form no clear rank-size hierarchy, these may well have worked together as equals on a political level, but at the same time competed economically to attract greater numbers of travellers to one particular settlement over another.

The western *central sector* underwent a different process. As the powers of both Mari and Ebla grew over the course of the mid-3rd millennium BC, they became economic and military rivals, each mobilising to control the land between the two, likely in a desire to exploit its potential wealth from wool (Meyer 2010a: 23-24; see also Section 2.2.2). This led to the claiming of the southern Euphrates-Balikh steppe by both polities, with military action evidenced in the Mari texts (Meyer 1996: 155-156). This competition had several beneficial effects on stable settlement in the GWJ. While the movement of troops from Mari possibly contributed to the local economy of routes across the *southern sector* as described above, urban centres in the Euphrates-Balikh steppe such as Tell Bi'a (aligned with Mari) and Tell al-Sweyhat (aligned with Ebla) grew as local communities were forced to choose sides. However, this segregation of small-scale areas had the side effect that communities became isolated from each other (Danti 2000: 306-308). This, together with pressure exerted by the regional polities for local surplus production to provide tribute, led to the establishment of numerous small settlements in the steppe, inhabited by pastoralists. Many of these might have been seasonal camps, used when the need for grazing the increasingly large herds of sheep was greatest. They likely remained under the direct control of local centres though, as they never grew to even medium-sized settlements that could be occupied on a long-term basis. In this area, it seems that with a few exceptions such as the *ringwall settlement* Site 408, exclusive pastoralism, rather than integrated agro-pastoralism and trade, was the sole priority. Such activity is supported by the Ebla texts, which, in describing military campaigns against Mari, mention the existence of numerous settlements in a region named *kur^ki^* (Meyer 1996: 155-156). This term has been interpreted as referring to the Euphrates-Balikh steppe by Michael Astour (1992: 26-32), who argues that textual indications that the inhabitants of the *kur^ki^* were focussed on large-scale sheep breeding and the export of pastoral produce speaks for it being related to uplands that were pastorally viable.

Meanwhile, the dominance of Tell Chuera over the *northern sector* grew, with the construction of Palast F further cementing Chuera's position as the capital of a "state". The emergence of the rigidly-planned *Parzellenhäuser* is additional evidence for a strong ruling power that closely controlled not only the political and economic, but also the domestic affairs of the city (Section 2.1.3.1). It is possible that these processes of power consolidation were in part a result of the successful quashing of some form of uprising, as potentially evidenced by the destructive violence that occurred at the start of TCH ID.

EJZ 4b (ca. 2300-2200 BC)

By the late 3rd millennium BC, it is clear that major factors were beginning to take their tolls on the settled communities of the GWJ, stretching their resilience strategies. One potential such factor was worsening climate conditions, which may have caused the average 200 mm rainfall isohyet to move north into the *central sector*, affecting agricultural potential. More concretely, the expansion of the Akkadian Empire, which reached the southern regions of Northern Mesopotamia and continued to move northwards during this period, likely played a major role. This initially disrupted trade routes as the Akkadian kings sought to directly control these rather than relying on intermediate local powers for access to valuable commodities (Liverani 2014: 141-143). Additionally, with the temporary destructions of first Ebla and then Mari around the start of this period, two major stable forces in the region were gone, which doubtless led to greater political and economic uncertainty. Conversely, the ceasing of frequent military campaigns between these two powers would have further negatively affected settlements dependent on long-distance routes. Thus these sites, such as those along the "Malhat line", were the first to be abandoned for lack of sustainability; coupled with the fact that their southern location would be affected the most by potential aridification.

As Akkadian control in Northern Mesopotamia became cemented, a reorganisation of agricultural surplus production followed, with further emphasis on direct top-down control leaving little room for local economies to operate independently (Kouchoukos 1998: 435-436). This caused a large-scale abandonment of the entire Jebel Abd al-Aziz area. This was not a genuine "collapse" of settlement however, as although abandoning the region was probably far from desired, it was likely a conscious choice made due to the ceasing of profitability of economies based in the *zone of uncertainty*. Furthermore, it was probably not a synchronous event; though still a fairly rapid knock-on effect of one major centre after another becoming vacated. While many settlers may have migrated back to the Khabur and Euphrates river valleys in search of better economic opportunities, nomadic tribespeople would likely have returned to their mobile lifestyles, from which they had likely never fully departed (see Porter 2012: 10-14). Within a century or so, the majority of the *central* and *southern* sectors were again solely occupied by the same nomadic tribes that had existed in them for millennia, for which textual evidence exists from the reign of the Assyrian king Shamshi-Adad (early 18th century BC; Kouchoukos 1998: 437; see also Porter 2012: 33-36).

The removal of Ebla as a regional player had the opposite effect on Middle Euphrates sites formerly under its restrictive influence, with Tell al-Sweyhat, now reaping the full benefits of its pastoral economy, becoming fortified and expanding to its maximum size (Danti 2000: 308-311). However, the small pastoral settlements in the southern Euphrates-Balikh steppe gradually disappeared as possible overgrazing due to an attempted maximisation of the potential of the steppe to support larger centres likely led to environmental degradation. Danti (2000: 308-311) envisages a process of "nomadisation" to have occurred, with steppe inhabitants increasing their mobility to enable the search for increasingly sparse patches of suitable grazing land.

The *northern sector*, by contrast, did not begin to be affected by the above events until slightly later, and far less rapidly; indeed any potential effects on the archaeological record are not visible until at least ca. 2240 BC (Helms & Tamm 2014). This can be put down to three possible factors: firstly, the Akkadian expansion did not move into the northernmost regions of Mesopotamia until slightly after this time. Secondly, this area was on a local level more politically and economically powerful, with a large surplus production able to at least temporarily keep the "state" of Tell Chuera largely self-sufficient despite a decline in long-distance trade. Lastly, in the event of an overall aridification, its initial effects would have been significantly lower in the *northern sector* due to the generally higher rainfall levels of the area.

Late EJZ 4b / EJZ 4c (ca. 2250-2100 BC)

Though very little is known about settlement in the GWJ during this phase (Meyer 2010a), some preliminary theories can be extrapolated. With the strengthening of Akkadian control across the region, possibly coupled with a trend towards less frequent years of sufficient precipitation, urban settlement continued to decline in the final centuries of the EBA. In the event of aridification of the regional climate, grain surpluses would have no longer existed, leading agriculture to be practiced close to subsistence level. This means that even if it were possible for settlements in the *northern sector* to develop a greater reliance on trade routes in lieu of local commodities, they would have had practically nothing to trade with. However, even if one discounts the uncertain role that climatic change played during this period, the type of control exerted by the Akkadian Empire alone made it extremely difficult for local polities to rely on the dimension of trade to supplement their economies. While these may have been able to remain self-sufficient for a certain amount of time (see above), this was likely not a stable economic system in the long term. Thus many sites in this last remaining settled part of the GWJ were abandoned at the outset of this phase, both large (such as Tell Dakhliz) and small. This in turn exacerbated the economic decline of the major centre Tell Chuera, which now had no support network and a lower population with which to manage large animal herds. The two-tiered fortified tells that continued to be inhabited shrank in size, with the lower towns of many becoming abandoned in favour of their central mounds only.

Eventually, towards the end of this period, extremely low economic returns and the increasingly difficult management of agro-pastoralist practices led to the complete abandonment of settlement in the *northern sector* also. Despite the collapse of the Akkadian Empire around 2150 BC, the evidence from Tell Chuera indicates that existence in the GWJ continued to be unfavourable, or at least that this event occurred too late to allow the economy of the steppe to recover; the damage had been done. Possible attempts to maximise pastoralism in response may have resulted in the same deurbanising effects as in the southern Euphrates-Balikh steppe. Another factor may have been deforestation, as woodland remains disappear from the record at sites in the vicinity during this time (Deckers & Pessin 2011: 39-41), perhaps as a result of an attempt to exploit a more unique trading commodity (than agricultural or pastoral produce) in a system dominated by external control. Thus a probable similar combination of a premeditated, if not entirely voluntary, withdrawal from the steppe and a reverting to nomadic practices occurred as did in the *central* and *southern sectors*, with the division between these responses along ancestral lines of permanent sedentarists versus nomadic settlers.

Section 6.2: Major Ramifications and Implicated Further Research

Several wide-reaching results can be distilled from the LC-EBA settlement developments discussed in the previous section. The most obvious is that, first and foremost, with 302 sites likely dating to this period identified by this research, the GWJ is not the "marginal" region it has long been considered to be. Not only does this statement apply to the complex urban processes that occurred within the steppe, but also their interactions with and effects upon the surrounding "core" regions of long-term settlement. Rather than being a side-venture entered into by a few large polities, the exploitation of this region was a major component of the regional and inter-regional economic and political landscape. Thus the GWJ is as integral to the study of Northern Mesopotamia as its well-researched fertile regions. As such, it requires further fieldwork to be able to afford a greater depth of knowledge than this thesis can provide. For obvious reasons, this may prove an impossible task for several years to come, however.

Secondly, it is possible to distinguish two very different and completely distinct trajectories of EBA settlement in the GWJ. The settlement dynamics of the *central* and *southern sectors* complement the pattern of the majority of Northern Mesopotamia, with dispersed small rural settlements during the early 3rd millennium BC giving way to increased numbers of large urbanised centres with monumental architecture, mass production of ceramics, and social differentiation in the mid-late 3rd millennium (Lawrence & Wilkinson 2015: 333-335). The *northern sector*, by contrast, sees urbanism continue to develop from its stage in late LC southern Anatolia, keeping the region's "initial experiment with early social complexity" going, whereas elsewhere it "failed" (Algaze 2008: 146-147). This does not appear to have been due to the adoption of Southern Mesopotamian models of organisation (such as has been argued for the mid-EBA urbanisation of the majority of Northern Mesopotamia [Algaze 2007]); instead a separate local development seems to have occurred. This provides a heterogeneous picture of not only the GWJ, but the wider region during the EBA, significantly adding to the current understanding of its settlement trajectories. It remains to be seen whether these variations in settlement patterns have their basis in a particular culture, or whether they are more dependent on location and environmental conditions. One way of investigating this would be to compare the regions of differing urban trajectories to ceramic distribution zones such as those of the metallic, reserved-slip, Ninevite 5, and combed-wash wares, and analyse any correlations. Another factor that could have affected cultural spread is trade routes, which in addition to the discussions of Section 5.3 could be investigated by analysing similarities and differences between the material cultures of sites around the periphery of the GWJ, determining their likely dispersions across the steppe.

Lastly, the question of what drives similarities and differences in site morphologies across semi-arid Near Eastern landscapes merits further research. For example, based on my classification system for the two-tiered fortified tells of the GWJ, it can be seen that significant differences exist between these sites; variations that are also reflected spatially and temporally. Conversely however, when one examines the wider region, broad similarities between structures in analogous environments become apparent, from the fortified tells of the Shamiya to the small circular enclosures of the Jordanian Badia (Section 5.4.1). If differences at the micro scale can be put down to cultural-economic variations, then similarities at the macro scale are often attributed to cultural connections, which, depending on the spatial and chronological distances involved, can often appear unlikely. Alternatively, it could be proposed that similar conditions precipitate similar responses by largely unconnected groups of people, and that some of the morphological characteristics of sites in the *zone of uncertainty* are simply particularly good fits for their climatic environments. A wider, but also in-depth comparative analysis could shed light on this, for example by choosing one or two other regions to examine in a similar manner as this thesis has the GWJ. This further touches on the fundamental topic of how humans create and respond to variations in their environments, and whether universal solutions are applicable across comparable conditions over a wide geographic area; an issue pertinent through time to the present day.

Appendix

Site ID	site name	UTM co-ordinates		survey area	source	ground survey's Site ID	site type code	clarity code	two-tiered fortified tell type	area (ha)	broad occupation periods	LC phases	EJZ phases	notes
		east	north											
2	Tell Sha'ir [Sarugh]	607504	4052735	Westjazira/ Sweyhat	ground survey		3	1	Dakhliz variety	14.6	EBA, Iron Age			
3	Tell Bandar Khan	621855	4045952	Westjazira/ Sweyhat	ground survey	17	2	1		10.2	EBA, MBA, Iron Age, Roman/Byzantine, Islamic			
4	Koberlik	630482	4041151	Westjazira/ Sweyhat	ground survey		1	2	Matin variety	25.4	EBA, Iron Age			
5	Tell Matin	618582	4038996	Westjazira/ Sweyhat	ground survey	15	1	2	Matin variety	63.0	EBA, Iron Age, Roman/Byzantine, Islamic			
6	Tell Marrak	611554	4037609	Westjazira/ Sweyhat	ground survey	21	17	1	Dakhliz variety	16.9	Halaf, EBA, MBA			
7	Tell Barabra east	602331	4037435	Westjazira/ Sweyhat	ground survey	23	1	1	true Kranzhügel	25.6	Halaf, LC, EBA, MBA, LBA, Iron Age			
8		619970	4013314	Westjazira/ Sweyhat	remote sensing		3	2	Matin variety	8.6				
9	Tell Fatsa	575777	4053001	Westjazira/ Sweyhat	ground survey		3	1	Matin variety	6.7				
18		575777	4053001	Wadi Hamar	remote sensing		17	2	other	7.3				
19		589543	4059689	unsurveyed	remote sensing		1	2	ringwall settlement	5.2				
20		621003	4038542	unsurveyed	remote sensing		12	1		8.7				
21	Tell Ghajar al-Kebir	639142	4039539	Wadi Hamar	ground survey	71	3	0	true Kranzhügel	20.3	EBA, MBA, LBA, Iron Age, Roman/Byzantine, Islamic			
22	Tell Chuera	578573	4052500	Wadi Hamar	ground survey		1	0	true Kranzhügel	68.0	Halaf, Ubaid, LC, EBA, LBA	1, 2	0, 1, 2, Final 2, 3a, 3b, 4a, 4b, 4c	
23	'Agilah	578570	4054760	Wadi Hamar	ground survey	3	10	0		34.3	Halaf, Ubaid, EBA, MBA		0, 1	
24	Tell Abu Shakhat	582140	4057249	unsurveyed	ground survey		1	0	true Kranzhügel	31.2				
25	Tell Bogha	582140	4057249	unsurveyed	ground survey		11	0	true Kranzhügel	21.8				
26		591832	4054255	unsurveyed	remote sensing		12	1		11.1				
27	Tell Khanzir	602627	4052973	unsurveyed	ground survey		1	0	true Kranzhügel	39.8				
28	Tell Kharab 'Arnan	618744	4047889	unsurveyed	remote sensing		4	1		8.9				with likely later-period enclosing wall
31	Tell Chanafes	602821	4036986	unsurveyed	remote sensing		1	1	true Kranzhügel	140.7				also "Tell Hanafis" in Arachne image database
34		605918	4037514	Yale Khabur	ground survey	189	1	0	ringwall settlement	4.5	EBA		3a, 3b	
35	Tell Hamam Sharqi	615133	4038982	Yale Khabur	ground survey	161	1	0	ringwall settlement	15.9	EBA		3a, 3b	
36	Tell Mabtuh Sharqi	615720	4038556	Yale Khabur	ground survey	128	1	0	true Kranzhügel	44.2	Halaf, EBA, Iron Age, Roman/Byzantine		2, Final 2, 3a, 3b, 4a, 4b, 4c	
37		623586	4037896	Yale Khabur	ground survey	156	1	0	other	7.3	EBA		1, 2, Final 2, 3a, 3b	

Table A.1: Complete table of all features identified by this thesis' survey, showing the main data collected on each. For explanations of site type codes and clarity codes see Sections 3.5.2.1-2.

Site ID	site name	UTM co-ordinates east	UTM co-ordinates north	survey area	source	ground survey's Site ID	site type code	clarity code	two-tiered fortified tell type	area (ha)	broad occupation periods	LC phases	EJZ phases	notes
38	Tell al-Magher	625318	4038967	Yale Khabur	ground survey	155	1	0	ringwall settlement	12.6	EBA		1, 2, Final 2, 3a, 3b	
39	Tell Mabtuh Gharbi	649297	4031688	Yale Khabur	ground survey	151	1	0	true Kranzhügel	28.5	Palaeolithic, EBA, Iron Age		1, 2, Final 2, 3a, 3b	
41	Tell Mu'azzar	645687	4025114	Yale Khabur	ground survey	39	1	0	ringwall settlement	13.8	EBA		1, 2, Final 2, 3a, 3b	
42		642855	4020330	unsurveyed	remote sensing		1	2	ringwall settlement	6.1				
43	Tell Sha'ir [Jazira]	642855	4020330	unsurveyed	ground survey	281	11	1	other	21.2				
44	Tell Zahamak	635091	4017101	unsurveyed	ground survey	282	3	1	other	50.1				also "Tell Ezhamak" on Moortgat-Correns 1972: Karte II
45		637527	4007974	unsurveyed	remote sensing		3	1	other	8.6				
46	Khirbet Malhat	631159	4006080	unsurveyed	ground survey		1	0	ringwall settlement	33.1	EBA		1, 2, Final 2, 3a, 3b	
48	Kharab Sayyar	627827	3995456	Wadi Hamar	ground survey	2	13	0		54.6	Islamic			
49		610335	4013653	Wadi Hamar	ground survey	4	5	0		14.9	Islamic			
50	'Agilah east	600326	4006491	Wadi Hamar	ground survey	6	14	0		1.3	Islamic			
51	Tell Kharab Sayyar	595337	4005714	Wadi Hamar	ground survey	1	2	0	other	3.5	Halaf, EBA, Islamic		0, 2, Final 2, 3a	
52		487418	4026562	Wadi Hamar	ground survey	9	14	0		0.3	Islamic			
53	Khirbet al-Khirgha	437823	4084275	Wadi Hamar	ground survey	10	15	0		18.6	Islamic			
54		473129	4062661	Wadi Hamar	ground survey	11	15	0		18.2	Islamic			
55		477631	4059584	Wadi Hamar	ground survey	12	15	0		25.8	Islamic			
56		471426	4053732	Wadi Hamar	ground survey	14	5	0		6.1	Islamic			
57	Khirbet Hajj Badran	491093	4051475	Wadi Hamar	ground survey	15	12	0		2.0	Halaf, Ubaid			
58	Khirbet Hajj Badran west	492649	4045937	Wadi Hamar	ground survey	16	12	0		0.6	Iron Age			
59	Kharijat 'Abdul MaHsin	536244	4056816	Wadi Hamar	ground survey	17	16	0		14.3	Iron Age, Islamic			
60	Khirbet al-Ftaim	544773	4055769	Wadi Hamar	ground survey	18	8	0		9.9	EBA, LBA, Iron Age			on wadi
61	Tell Harubi	557311	4050129	Wadi Hamar	ground survey	19	7	0		26.7	Halaf, Ubaid, EBA, Iron Age, Islamic			
62	Msherifa	621602	3977167	Wadi Hamar	ground survey	21	4	0		12.2	Halaf, EBA, Iron Age			
63	Riji'a	550689	4049500	Wadi Hamar	ground survey	24	6	0		8.0	Halaf, Ubaid, Islamic			
64	Rijan 2	547809	4056758	Wadi Hamar	ground survey	26	8	0		26.1	Islamic			
65	Sukn	552610	4059229	Wadi Hamar	ground survey	30	15	0		10.0	Islamic			on wadi
66		554142	4061588	Wadi Hamar	ground survey	32	14	0		2.9	Islamic			on high embankments near wadi
67		552494	4056928	Wadi Hamar	ground survey	36	16	0		5.3	Islamic			
68		556257	4055691	Wadi Hamar	ground survey	37	14	0		1.3	Islamic			on wadi
69	Mutamshriq	539742	4047529	Wadi Hamar	ground survey	39	15	0		15.7	Islamic			
70		545368	4046613	Wadi Hamar	ground survey	40	12	0		1.0	EBA, Iron Age			near wadi
71	Khirbat 'AHmad as-Sibn	548392	4054432	Wadi Hamar	ground survey	41	14	0		3.0	Halaf, Ubaid, EBA, Islamic			on wadi
72	Tell Dakhliz	542695	4050325	Wadi Hamar	ground survey	44	3	0	Dakhliz variety	23.0	EBA, Iron Age		0, 1, 2, Final 2, 3a, 3b, 4a	
73	Tell Zaidi	540258	4047974	Wadi Hamar	ground survey	45	10	0		5.1	Halaf, EBA, LBA, Iron Age, Islamic		0, 1	
74	Tell Zaidan	544263	4044070	Wadi Hamar	ground survey	46	10	0		8.4	Halaf, Iron Age, Islamic			with possible lower town settlement
75		541908	4053963	Wadi Hamar	ground survey	47	12	0		2.5	EBA			
76		544648	4054916	Wadi Hamar	ground survey	51	16	0		0.8	Islamic			
77		553204	4061359	Wadi Hamar	ground survey	52	16	0		7.7	Islamic			
78	Chuera al-SaHira	427940	4076217	Wadi Hamar	ground survey	54	14	0		35.8	Iron Age, Islamic			

Table A.1 (continued)

Site ID	site name	UTM co-ordinates east	UTM co-ordinates north	survey area	source	ground survey's Site ID	site type code	clarity code	two-tiered fortified tell type	area (ha)	broad occupation periods	LC phases	EJZ phases	notes
79	Khirbet al-Taib'a	449928	4078424	Wadi Hamar	ground survey	55	14	0		6.1	Islamic			near wadis
80	Khirbet 'Atalah	458952	4062796	Wadi Hamar	ground survey	56	5	0		5.4	Islamic			
81	Zaidi Shargh	473259	4062990	Wadi Hamar	ground survey	58	16	0		4.3	Islamic			
82		479423	4047928	Wadi Hamar	ground survey	59	16	0		2.6	Islamic			
83	Khirbet Hisain Sultan	492089	4046254	Wadi Hamar	ground survey	60	16	0		0.7	Islamic			
84	Umm al-Hayayah	478379	4040575	Wadi Hamar	ground survey	61	6	0		11.7	EBA, Iron Age, Islamic			
85		487856	4046575	Wadi Hamar	ground survey	62	14	0		0.7	Islamic			
86		471311	4055648	Wadi Hamar	ground survey	63	14	0		0.3	Islamic			single building
87	Khirbet al-Hanuni	420281	4070867	Wadi Hamar	ground survey	64	5	0		1.6	EBA, Islamic			
88		457243	4061872	Wadi Hamar	ground survey	65	5	0		2.2	Islamic			
89		454568	4069517	Wadi Hamar	ground survey	66	5	0		12.2	Islamic			
90	Khirbet al-Khatali	457698	4076619	Wadi Hamar	ground survey	67	15	0		17.3	Islamic			near wadi; with possible hollow ways
91	Tell Tawila	443223	4072680	Wadi Hamar	ground survey	68	7	0		7.7	Halaf, Ubaid, LC, EBA, Iron Age, Islamic	1, 2	0, 1	very obscured by modern crossroads
92	Khirbet al-Arritah	420639	4073465	Wadi Hamar	ground survey	69	15	0		8.9	Islamic			on wadi
93	Tell al-Magaf	497221	4021115	Wadi Hamar	ground survey	70	7	0		4.7	LBA, Iron Age, Islamic			near wadi
94	Khirbet Umm al-Gatum	497747	4032847	Wadi Hamar	ground survey	72	14	0		3.4	EBA			
95	Amdainah 'Abid Fanus	486092	4059923	Wadi Hamar	ground survey	73	6	0		5.7	Islamic			on wadi confluence
96	Khirbet S'abah	488813	4061501	Wadi Hamar	ground survey	74	8	0		2.0	Islamic			on wadi
97	khirbat shidi	497908	4028690	Wadi Hamar	ground survey	77	8	0		0.5				
98	Hisan	442849	4049074	Wadi Hamar	ground survey	78	16	0		3.2				
99	khirbat Dil-jumih	651616	4012831	Wadi Hamar	ground survey	79	12	0		1.6				
100	um al-Drab	445446	4007902	Wadi Hamar	ground survey	80	14	0		1.3				on wadi
101	khirbat Silkan	475383	4002190	Wadi Hamar	ground survey	81	14	0		1.3				on wadi
102	khirbat l'asajah	473290	4006258	Wadi Hamar	ground survey	82	16	0		3.2				near wadi
103	M'atrabih	604785	4082255	Wadi Hamar	ground survey	83	14	0		1.0				
104	khirbat traih	585708	3980780	Wadi Hamar	ground survey	84	14	0		0.7				
105	um jurn	514490	4034011	Wadi Hamar	ground survey	86	14	0		15.1				
106	hamdush	515504	4036842	Wadi Hamar	ground survey	87	14	0		4.1				
107		533268	4046920	Wadi Hamar	ground survey	91	6	0		14.2				
108		517587	4046371	Wadi Hamar	ground survey	92	14	0		1.1				
109		514700	4030491	Wadi Hamar	ground survey	93	6	0		2.3				
110		519264	4005572	Wadi Hamar	ground survey	94	6	0		0.8				
111	um al-jisum	531336	4058147	Wadi Hamar	ground survey	95	6	0		0.6				
112		508314	4047916	Wadi Hamar	ground survey	96	6	0		0.3				
113		554883	4017686	Wadi Hamar	ground survey	97	6	0		0.4				
114		538421	4033417	Wadi Hamar	ground survey	99	16	0		2.4				on wadi
115		550556	3980453	Wadi Hamar	ground survey	100	16	0		3.5				
116	Tell Glai'a	557595	3994454	unsurveyed	ground survey		3	0	Dakhliz variety	18.2				
119		515823	3982663	Wadi Hamar	ground survey	104	15	0		10.2				
120		455784	4058673	Wadi Hamar	ground survey	105	16	0		2.0				
121		446051	4052131	Wadi Hamar	ground survey	106	8	0		2.9				
122		463304	4045641	Wadi Hamar	ground survey	107	16	0		3.7				
123		467212	4047749	Wadi Hamar	ground survey	108	16	0		4.2				
124	Sail 1	468634	4042227	Wadi Hamar	ground survey	W1	14	0		5.1				

Table A.1 (continued)

Site ID	site name	UTM co-ordinates east	UTM co-ordinates north	survey area	source	ground survey's Site ID	site type code	clarity code	two-tiered fortified tell type	area (ha)	broad occupation periods	LC phases	EJZ phases	notes
125	Sail 2	473370	4049706	Wadi Hamar	ground survey	W2	14	0		0.7				
126	Sail 3	478017	4046378	Wadi Hamar	ground survey	W3	14	0		0.8				
127	Chuera 1	478329	4047831	Wadi Hamar	ground survey	109	14	0		1.2				
128	Khirbet al-Dibat	476378	4048593	Wadi Hamar	ground survey	22	14	0		1.1	Halaf, Ubaid, EBA, Iron Age			
129	Chuera 7	490637	4045820	Wadi Hamar	ground survey	115	8	0		0.1				on wadi
130	Kharab Sayyar 1	479130	4042183	Wadi Hamar	ground survey	116	14	0		0.2				
131		477620	4042042	Wadi Hamar	ground survey	118	14	0		0.3				
132		485668	4040900	Wadi Hamar	ground survey	119	14	0		0.5				
133	Bit Ambr	484333	4052328	Wadi Hamar	ground survey	121	16	0		0.7				
134	Um Drub	485819	4055273	Wadi Hamar	ground survey	122	15	0		8.3				on wadi
135	Drabieh	486065	4057377	Wadi Hamar	ground survey	123	16	0		1.6				
136		472781	4056708	Wadi Hamar	ground survey	127	16	0		3.6				near wadi
137		472584	4055153	Wadi Hamar	ground survey	128	16	0		0.2				near wadi
138	Chuera 9	442902	4054436	Wadi Hamar	ground survey	132	8	0		1.8				
139	Welan SBZ	433534	4068985	Wadi Hamar	ground survey	W15_2	16	0		6.4	LBA			
140	Welan 2	457984	4065217	Wadi Hamar	ground survey	W16	14	0		0.9				
141	Raghir	455858	4065028	Wadi Hamar	ground survey	W 17	15	0		18.3				on wadi
142	Ahoish	459707	4066059	Wadi Hamar	ground survey	W 18	15	0		15.6				
143	Twaim 3	460481	4065377	Wadi Hamar	ground survey	208	10	0		26.1				
144		460542	4076398	Wadi Hamar	remote sensing		4	2		1.0				
145		452681	4077420	Wadi Hamar	remote sensing		4	2		0.7				
146		455334	4079570	Wadi Hamar	remote sensing		8	1		1.3				
147		453901	4080191	Wadi Hamar	remote sensing		15	1		4.6				
148	Msherifa west	452448	4079711	Wadi Hamar	ground survey		14	1		1.1	Halaf, EBA			
149		445049	4081910	Wadi Hamar	remote sensing		8	1		2.0				
150		429704	4081666	Wadi Hamar	remote sensing		14	1		0.5				
151		491217	4038009	Wadi Hamar	remote sensing		14	1		1.3				
152		464327	4053452	Wadi Hamar	remote sensing		14	1		0.5				single building
153		470016	4016884	Wadi Hamar	remote sensing		14	1		0.4				single building
154		439877	4080588	Wadi Hamar	remote sensing		8	1		2.1				
155		432029	4073772	Wadi Hamar	remote sensing		14	1		0.4				single building
156		456806	4065828	Wadi Hamar	remote sensing		14	1		0.2				single building
157		479787	4061011	Wadi Hamar	remote sensing		4	2		0.1				
158		438669	4055940	Wadi Hamar	remote sensing		14	1		11.6				
159		438406	4055135	Wadi Hamar	remote sensing		4	3		0.6				
160		433806	4056739	Wadi Hamar	remote sensing		14	2		4.6				
161		436489	4052050	Wadi Hamar	remote sensing		14	2		1.3				
162		495917	4058509	Wadi Hamar	remote sensing		15	1		1.8				
163		495771	4057002	Wadi Hamar	remote sensing		8	1		5.1				
164		492579	4053412	Wadi Hamar	remote sensing		14	1		0.9				
165		482082	4049949	Wadi Hamar	remote sensing		14	2		0.4				single building
166		491718	4049540	Wadi Hamar	remote sensing		4	2		0.7				
167		468504	4046526	Wadi Hamar	remote sensing		8	1		2.0				
168		484831	4045447	Wadi Hamar	remote sensing		15	1		9.7				
169		488283	4040996	Wadi Hamar	remote sensing		14	2		0.5				
170		495973	4029749	Wadi Hamar	remote sensing		14	2		1.8				
171		484102	4026649	Wadi Hamar	remote sensing		14	2		0.9				
172		490224	4025821	Wadi Hamar	remote sensing		14	1		0.3				single building
173		469306	4027451	Wadi Hamar	remote sensing		14	1		3.1				

Table A.1 (continued)

Site ID	site name	UTM co-ordinates east	UTM co-ordinates north	survey area	source	ground survey's Site ID	site type code	clarity code	two-tiered fortified tell type	area (ha)	broad occupation periods	LC phases	EJZ phases	notes
174		449276	4024146	Wadi Hamar	remote sensing		14	1		2.1				
175		445548	4027828	Wadi Hamar	remote sensing		8	1		5.4				
176		441713	4014772	Wadi Hamar	remote sensing		14	2		1.7				
177		578489	3958182	Wadi Hamar	remote sensing		14	1		0.6				
178		581792	3958305	Wadi Hamar	remote sensing		15	1		14.3				
179		539394	3992495	Wadi Hamar	remote sensing		14	1		3.7				
180		558420	4009352	Wadi Hamar	remote sensing		14	1		1.1				
181		516749	3979523	Wadi Hamar	remote sensing		14	1		0.5				
182		524715	4016627	Wadi Hamar	remote sensing		14	1		0.2				single building
183		571434	4059884	Wadi Hamar	remote sensing		14	2		17.2				
184		528123	4057418	Wadi Hamar	remote sensing		14	2		2.1				single building
185		507792	4062029	Wadi Hamar	remote sensing		14	1		2.6				
186		507936	4062200	Wadi Hamar	remote sensing		14	1		0.3				single building
187		502740	4063004	Wadi Hamar	remote sensing		14	1		5.9				
188		502767	4062659	Wadi Hamar	remote sensing		4	2		0.8				
189		584955	4069322	Wadi Hamar	remote sensing		14	2		0.7				single building
190		584787	4068977	Wadi Hamar	remote sensing		4	2		0.5				
191		569586	4066328	Wadi Hamar	remote sensing		4	2		1.4				
192		599339	3979112	Wadi Hamar	remote sensing		14	1		2.8				
193		591152	3979420	Wadi Hamar	remote sensing		14	1		0.4				single building
194		495208	4035023	Wadi Hamar	remote sensing		14	1		0.5				single building
195		497867	4028338	Wadi Hamar	remote sensing		14	2		0.8				
196		530403	4059332	Wadi Hamar	remote sensing		14	3		0.9				
197		539936	4036275	Wadi Hamar	remote sensing		4	3		1.0				
198		566446	4055732	Wadi Hamar	remote sensing		4	2		2.6				
199		577767	4062031	Wadi Hamar	remote sensing		8	2		1.9				
200	Tell Aukhan	574638	4066799	Westjazira/ Sweyhat	ground survey	1	18	1		6.3	Palaeolithic, EBA, Iron Age			
201	Sirrin, gravetower	574773	4068026	Westjazira/ Sweyhat	ground survey	4	14	1		3.5	Roman/Byzantine			
202	Tell Hajib	550071	4049942	Westjazira/ Sweyhat	ground survey	7	2	1		5.2	Halaf, Ubaid, LC, EBA, MBA, Iron Age, Roman/Byzantine, Islamic			
203	Boz Höyük taHtani	557328	4051432	Westjazira/ Sweyhat	ground survey	9	4	1		6.8	EBA, Iron Age			
204	Tell Bandar Khan north	558157	4049389	Westjazira/ Sweyhat	ground survey	16	4	1		2.6	Halaf, EBA			
205	Tell Muhra	555682	4049863	Westjazira/ Sweyhat	ground survey	19	4	1		0.7	Halaf			
206	Tell Muhra lower town	559307	4054287	Westjazira/ Sweyhat	ground survey	19	15	1		24.1	Halaf			
207	Tell Marrak north	558642	4053460	Westjazira/ Sweyhat	ground survey	20	12	1		0.9	Halaf			
209	Tell FaTsa east	559559	4054040	Westjazira/ Sweyhat	ground survey	24	4	2		2.4	Halaf			
210	Tell Kufaifa (Kur Kahiya)	559696	4057506	Westjazira/ Sweyhat	ground survey	18	1	2	Matin variety	34.2	EBA			
211	Tell Sirrin	559234	4057752	Westjazira/ Sweyhat	ground survey	3	4	2		1.2	Halaf, Iron Age, Roman/Byzantine			

Table A.1 (continued)

Site ID	site name	UTM co-ordinates		survey area	source	ground survey's Site ID	site type code	clarity code	two-tiered fortified tell type	area (ha)	broad occupation periods	LC phases	EJZ phases	notes
		east	north											
212	Tell Aukhan east	558998	4057432	Westjazira/ Sweyhat	ground survey	2	2	1		1.3				
213	Tell 'Umar	556196	4060102	Westjazira/ Sweyhat	ground survey	5	18	1		1.6	Halaf, Iron Age, Roman/Byzantine			
214	Arslan Tash	556301	4058246	Westjazira/ Sweyhat	ground survey	6	6	2		5.5	Iron Age			
215	Tell Karus	555188	4057403	Westjazira/ Sweyhat	ground survey	8	4	3		2.2	Iron Age, Roman/Byzantine			
216	Khanik TaHtani	552412	4054551	Westjazira/ Sweyhat	ground survey	10	6	1		10.7	Roman/Byzantine			
217	Tell Barabra northwest	555842	4053432	Westjazira/ Sweyhat	ground survey	22	4	1		3.3	EBA			
218	Khanik Fuqani	550525	4053331	Westjazira/ Sweyhat	ground survey		7	2		4.2				toponym from "Carte du Levant"
219	Mula	553654	4053498	Westjazira/ Sweyhat	ground survey		4	1		0.7				toponym from "Carte du Levant"
220		549305	4055661	Westjazira/ Sweyhat	ground survey		4	3		6.4				
221	Kharabesq	542052	4042207	Westjazira/ Sweyhat	ground survey		6	0		10.1				toponym from "Carte du Levant"
222	Göktepe	555804	4060142	Westjazira/ Sweyhat	ground survey		7	1		2.8				toponym from "Carte du Levant"
223	Safari	556600	4059916	Westjazira/ Sweyhat	ground survey		7	1		2.3				toponym from "Carte du Levant"
224	kurtik	544130	4058563	Westjazira/ Sweyhat	ground survey		7	3		10.3	Iron Age			
225	shash	542451	4048637	Westjazira/ Sweyhat	ground survey		10	2		9.1	Iron Age			
226	Abu Hayiye	545829	4046721	Westjazira/ Sweyhat	ground survey		6	0		27.2				toponym from "Carte du Levant"
227	Khirbet el Baqar	545674	4046929	Westjazira/ Sweyhat	ground survey		6	0		3.9				toponym from "Carte du Levant"
228	Kur Hassane	545103	4051406	Westjazira/ Sweyhat	ground survey		7	2		8.6				toponym from "Carte du Levant"
229	Tell Maba'uje	545086	4051864	Westjazira/ Sweyhat	ground survey		10	3		1.2				toponym from "Carte du Levant"
230	wasta	541446	4049590	Westjazira/ Sweyhat	ground survey		7	2		5.4	Iron Age			
231		540400	4047880	Westjazira/ Sweyhat	ground survey		12	3		1.8				
232		543585	4043891	Westjazira/ Sweyhat	ground survey		10	3		12.2				
233	jaHsha	543749	4043796	Westjazira/ Sweyhat	ground survey		7	1		9.2	Iron Age			
234		544361	4041163	Westjazira/ Sweyhat	ground survey		15	1		46.3				possible tell as well
235	Freyihane	540285	4041644	Westjazira/ Sweyhat	ground survey		6	0		11.5				toponym from "Carte du Levant"

Table A.1 (continued)

Site ID	site name	UTM co-ordinates east	UTM co-ordinates north	survey area	source	ground survey's Site ID	site type code	clarity code	two-tiered fortified tell type	area (ha)	broad occupation periods	LC phases	EJZ phases	notes
236	Ariza	538749	4040381	Westjazira/ Sweyhat	ground survey		4	3		7.1				toponym from "Carte du Levant"
237	Freyihan	547333	4045483	Westjazira/ Sweyhat	ground survey		4	1		1.9				toponym from "Carte du Levant"
238	Buga	548623	4044930	Westjazira/ Sweyhat	ground survey		10	1		3.7	EBA			
239	abu khraiza	547447	4040207	Westjazira/ Sweyhat	ground survey		6	0		3.8	Iron Age			
240	Tell Medliq	546199	4040570	Westjazira/ Sweyhat	ground survey		8	1		0.1				toponym from "Carte du Levant"
241	khirbet al-basha	546885	4038654	Westjazira/ Sweyhat	ground survey		10	2		4.1	EBA, Iron Age			
242		549156	4045914	Westjazira/ Sweyhat	ground survey		10	2		6.6				
243		549541	4046212	Westjazira/ Sweyhat	ground survey		10	1		2.4				
244	juzaila	550912	4046195	Westjazira/ Sweyhat	ground survey		10	1		2.8	Iron Age			
245	Tell Braj	552561	4042529	Westjazira/ Sweyhat	ground survey		10	3		3.6				toponym from "Carte du Levant"
246	Ditsh	552217	4041005	Westjazira/ Sweyhat	ground survey		10	2		4.7				toponym from "Carte du Levant"
247	Sukariye	547597	4059429	Westjazira/ Sweyhat	ground survey		7	3		2.9				toponym from "Carte du Levant"
248	tell dabban	548271	4059761	Westjazira/ Sweyhat	ground survey		4	1		1.7	Iron Age			interesting feature just southwest of this also
249		550147	4050984	Westjazira/ Sweyhat	ground survey		8	1		0.6				
250	Bir Habash	550953	4050974	Westjazira/ Sweyhat	ground survey		10	2		6.6				toponym from "Carte du Levant"
251	Darb Hasan	552294	4049747	Westjazira/ Sweyhat	ground survey		6	0		14.1	EBA			
252		549869	4048267	Westjazira/ Sweyhat	ground survey		4	3		2.6				
253	Kushkhar	549704	4047994	Westjazira/ Sweyhat	ground survey		6	0		8.1				toponym from "Carte du Levant"
254	qartal	549404	4047889	Westjazira/ Sweyhat	ground survey		10	2		5.9	Iron Age			
255	Arslan Köy	549166	4047860	Westjazira/ Sweyhat	ground survey		10	3		3.5				toponym from "Carte du Levant"
256	Talik	552260	4046706	Westjazira/ Sweyhat	ground survey		10	1		2.0	EBA			
257	Zaruik	548245	4049920	Westjazira/ Sweyhat	ground survey		8	1		0.8				toponym from "Carte du Levant"
258		559712	4059008	Westjazira/ Sweyhat	ground survey		8	1		0.3				
259		546305	4050131	Westjazira/ Sweyhat	ground survey		12	1		0.6				

Table A.1 (continued)

Site ID	site name	UTM co-ordinates		survey area	source	ground survey's Site ID	site type code	clarity code	two-tiered fortified tell type	area (ha)	broad occupation periods	LC phases	EJZ phases	notes
		east	north											
260	dunjuz saghir	545590	4050022	Westjazira/ Sweyhat	ground survey		12	3		1.0	Iron Age			
261	Boz Höyük fuqani	544640	4049229	Westjazira/ Sweyhat	ground survey		2	1		2.7	EBA			
262	Tahtik Fuqani	546650	4047062	Westjazira/ Sweyhat	ground survey		6	0		5.7				toponym from "Carte du Levant"
263	Kharab	547259	4047518	Westjazira/ Sweyhat	ground survey		7	2		3.4				toponym from "Carte du Levant"
264		536392	4059173	Westjazira/ Sweyhat	ground survey		4	2		9.4				
265	Juir Ballek	535105	4058471	Westjazira/ Sweyhat	ground survey		6	0		5.6				toponym from "Carte du Levant"
266	Lehine	536733	4058530	Westjazira/ Sweyhat	ground survey		7	3		5.0				toponym from "Carte du Levant"
267	Tashli Höyük	544944	4054828	Westjazira/ Sweyhat	ground survey		4	2		2.1	EBA			
268	Kharab Nas	544988	4054037	Westjazira/ Sweyhat	ground survey		4	1		1.2				toponym from "Carte du Levant"
269	Ain al-Bat	551121	4049304	Westjazira/ Sweyhat	ground survey		4	2		1.8	EBA			
270	Teyiri	550757	4051625	Westjazira/ Sweyhat	ground survey		7	2		2.5				toponym from "Carte du Levant"
271	Juiri Naf	550546	4051538	Westjazira/ Sweyhat	ground survey		7	1		9.8				toponym from "Carte du Levant"
272	Kossik	545369	4053721	Westjazira/ Sweyhat	ground survey		8	1		1.4				toponym from "Carte du Levant"
273	Jum 'Ali	544841	4053607	Westjazira/ Sweyhat	ground survey		7	3		5.9				toponym from "Carte du Levant"
274		545594	4053510	Westjazira/ Sweyhat	ground survey		8	1		3.0				
275	Malyol	546732	4053864	Westjazira/ Sweyhat	ground survey		18	3		3.4				toponym from "Carte du Levant"
276	Tell Jazal	546907	4054096	Westjazira/ Sweyhat	ground survey		4	1		1.1	EBA			
277	tell 'ain al-'arab	545711	4056743	Westjazira/ Sweyhat	ground survey		3	1		4.3	Iron Age			
278		532213	4057745	Westjazira/ Sweyhat	ground survey		12	2		6.6				
279	el-Susane	532168	4058370	Westjazira/ Sweyhat	ground survey		4	2		0.9				toponym from "Carte du Levant"
280	tell rufi	537305	4055417	Westjazira/ Sweyhat	ground survey		4	2		0.9	Iron Age			
281	Darbazin	536251	4054513	Westjazira/ Sweyhat	ground survey		8	2		5.6	EBA			
282		551101	4063112	Westjazira/ Sweyhat	ground survey		15	1		47.9				
283	Tell el-Halib	549497	4062955	Westjazira/ Sweyhat	ground survey		4	1		0.9				toponym from "Carte du Levant"

Table A.1 (continued)

Site ID	site name	UTM co-ordinates east	UTM co-ordinates north	survey area	source	ground survey's Site ID	site type code	clarity code	two-tiered fortified tell type	area (ha)	broad occupation periods	LC phases	EJZ phases	notes
284		551201	4062745	Westjazira/ Sweyhat	ground survey		4	1		1.8				
285		558598	4060300	Westjazira/ Sweyhat	ground survey		12	1		3.9				
286		555607	4061341	Westjazira/ Sweyhat	ground survey		4	2		2.9				"cut" through middle of site
287		546643	4061098	Westjazira/ Sweyhat	ground survey		8	1		2.1				
289	Tell Rigliya	549172	4058746	Westjazira/ Sweyhat	ground survey		4	2		3.8	EBA			
290		549745	4059526	Westjazira/ Sweyhat	ground survey		8	1		0.7				
291		554527	4059550	Westjazira/ Sweyhat	ground survey		8	1		7.2				
292	Tell Ain Isa	558319	4056886	Westjazira/ Sweyhat	ground survey		2	1		3.4	EBA, Iron Age			
293	Keklik Tahtani	553771	4057915	Westjazira/ Sweyhat	remote sensing		10	1		9.1				toponym from "Carte du Levant"
294		551881	4057933	Westjazira/ Sweyhat	remote sensing		5	3		10.0				
296		547828	4058140	Westjazira/ Sweyhat	remote sensing		10	2		1.4				
298	Khirbet Hadla	546352	4058023	Westjazira/ Sweyhat	remote sensing		15	1		113.9				toponym from "Carte du Levant"
302	Mameyit	540391	4057537	Westjazira/ Sweyhat	remote sensing		4	2		1.6				toponym from "Carte du Levant"
303		536620	4056514	Westjazira/ Sweyhat	remote sensing		7	3		2.8				
304		552853	4056019	Westjazira/ Sweyhat	remote sensing		12	3		2.0				
305	Sitiye	554215	4055473	Westjazira/ Sweyhat	remote sensing		4	1		1.8				toponym from "Carte du Levant"
306		560959	4055536	Westjazira/ Sweyhat	remote sensing		4	3		5.0				
307		560935	4054360	Westjazira/ Sweyhat	remote sensing		2	2		9.6				
308		560839	4053433	Westjazira/ Sweyhat	remote sensing		4	1		0.7				
313		554434	4053583	Westjazira/ Sweyhat	remote sensing		4	2		1.2				
314	Qotsheq	537757	4052317	Westjazira/ Sweyhat	remote sensing		12	3		12.1				toponym from "Carte du Levant"
315		538135	4053232	Westjazira/ Sweyhat	remote sensing		4	1		4.5				
316	Sharikh	549304	4052257	Westjazira/ Sweyhat	remote sensing		4	1		1.8				toponym from "Carte du Levant"
317		552151	4052041	Westjazira/ Sweyhat	remote sensing		4	3		1.7				

Table A.1 (continued)

Site ID	site name	UTM co-ordinates		survey area	source	ground survey's Site ID	site type code	clarity code	two-tiered fortified tell type	area (ha)	broad occupation periods	LC phases	EJZ phases	notes
		east	north											
318	Sabat Fuqani	559051	4052332	Westjazira/ Sweyhat	remote sensing		2	2		5.2				toponym from "Carte du Levant"
319	Sabat Tahtani	562147	4051111	Westjazira/ Sweyhat	remote sensing		10	3		5.7				toponym from "Carte du Levant"
320	Dikdere	548242	4050289	Westjazira/ Sweyhat	remote sensing		4	2		4.2				toponym from "Carte du Levant"
321	Khirbet el-Berj	540613	4050838	Westjazira/ Sweyhat	remote sensing		4	2		0.4				toponym from "Carte du Levant"
322		538702	4051534	Westjazira/ Sweyhat	remote sensing		4	1		0.8				
323	Tell Aktshal	538156	4051540	Westjazira/ Sweyhat	remote sensing		4	1		5.7				toponym from "Carte du Levant"
325	Tell Jadle	537520	4050994	Westjazira/ Sweyhat	remote sensing		4	1		2.1				toponym from "Carte du Levant"
327	Ferja	561913	4049962	Westjazira/ Sweyhat	remote sensing		15	2		35.8				toponym from "Carte du Levant"
328	Khneyizir	555217	4047832	Westjazira/ Sweyhat	remote sensing		4	1		0.7				toponym from "Carte du Levant"
329	Umm Ghu'eir	538909	4045702	Westjazira/ Sweyhat	remote sensing		2	1		3.3				toponym from "Carte du Levant"
330		541072	4045471	Westjazira/ Sweyhat	remote sensing		15	3		2.7				
331		547867	4046800	Westjazira/ Sweyhat	remote sensing		15	2		4.0				
332	Sharabaniye	547873	4046416	Westjazira/ Sweyhat	remote sensing		15	2		7.4				toponym from "Carte du Levant"
333	Aswad	559240	4045582	Westjazira/ Sweyhat	remote sensing		4	3		2.7				toponym from "Carte du Levant"
334		546964	4044496	Westjazira/ Sweyhat	remote sensing		15	2		6.0				
337	Khirbet Sa'adi	546463	4043686	Westjazira/ Sweyhat	remote sensing		16	3		17.1				toponym from "Carte du Levant"
338		544033	4044406	Westjazira/ Sweyhat	ground survey	28	4	0		8.3				
344		541255	4044688	Westjazira/ Sweyhat	remote sensing		14	2		0.3				single building
345		541006	4043041	Westjazira/ Sweyhat	remote sensing		7	1		1.0				
346		541132	4042678	Westjazira/ Sweyhat	remote sensing		7	2		9.6				
347		551371	4042906	Westjazira/ Sweyhat	remote sensing		4	2		1.5				
348		553675	4042717	Westjazira/ Sweyhat	remote sensing		2	2		1.6				
349		559411	4042888	Westjazira/ Sweyhat	remote sensing		4	3		0.5				
350		538780	4041616	Westjazira/ Sweyhat	remote sensing		7	2		0.2				

Table A.1 (continued)

Site ID	site name	UTM co-ordinates		survey area	source	ground survey's Site ID	site type code	clarity code	two-tiered fortified tell type	area (ha)	broad occupation periods	LC phases	EJZ phases	notes
		east	north											
351		538489	4040746	Westjazira/ Sweyhat	remote sensing		18	1		4.5				
352		539206	4041352	Westjazira/ Sweyhat	remote sensing		4	3		0.3				
353		540538	4039123	Westjazira/ Sweyhat	remote sensing		14	1		0.1				single building
354		539476	4039882	Westjazira/ Sweyhat	remote sensing		15	2		2.1				
355		546136	4038877	Westjazira/ Sweyhat	remote sensing		4	3		11.7				
356		549277	4039225	Westjazira/ Sweyhat	remote sensing		7	3		3.3				
357		438277	4049135	Westjazira/ Sweyhat	remote sensing		18	2		0.3				
358		483716	4047495	Westjazira/ Sweyhat	remote sensing		14	1		2.2				single building
359	Khariye	483716	4047495	Westjazira/ Sweyhat	remote sensing		4	2		28.8				possible small mound; toponym from "Carte du Levant"
360		491043	4052831	Westjazira/ Sweyhat	remote sensing		14	1		1.0				
361		498138	4029282	Westjazira/ Sweyhat	remote sensing		4	2		0.3				possible small mound
362	Khirbet Flayifel	437318	4049587	Westjazira/ Sweyhat	remote sensing		4	2		7.0				possible small mound; toponym from "Carte du Levant"
363		428375	4075742	Westjazira/ Sweyhat	remote sensing		4	3		1.5				possible small mound
364	Jurra	448223	4079118	Westjazira/ Sweyhat	remote sensing		15	1		12.3				toponym from "Carte du Levant"
365		447350	4078287	Westjazira/ Sweyhat	remote sensing		15	3		4.3				
366		451964	4065704	Westjazira/ Sweyhat	remote sensing		15	1		22.8				
367		457019	4054765	Westjazira/ Sweyhat	remote sensing		14	3		3.3				possible mound too
368	Dulq Merhar	448021	4048618	Westjazira/ Sweyhat	remote sensing		4	1		13.4				toponym from "Carte du Levant"
369		469980	4048603	Westjazira/ Sweyhat	remote sensing		15	1		3.1				possible mound too
370		470290	4050157	Westjazira/ Sweyhat	remote sensing		14	2		1.6				
371		481263	4047086	Westjazira/ Sweyhat	remote sensing		18	3		1.2				
372		485196	4046336	Westjazira/ Sweyhat	remote sensing		14	3		5.2				
373		486812	4044894	Westjazira/ Sweyhat	remote sensing		15	1		7.6				in wadi
374		486285	4042418	Westjazira/ Sweyhat	remote sensing		14	1		1.5				

Table A.1 (continued)

Site ID	site name	UTM co-ordinates		survey area	source	ground survey's Site ID	site type code	clarity code	two-tiered fortified tell type	area (ha)	broad occupation periods	LC phases	EJZ phases	notes
		east	north											
375	Qadriye	491165	4040857	Westjazira/ Sweyhat	remote sensing		18	1		15.3				toponym from "Carte du Levant"
376	Mahfaze	480777	4040289	Westjazira/ Sweyhat	remote sensing		15	2		2.1				toponym from "Carte du Levant"
377		494657	4048115	Westjazira/ Sweyhat	remote sensing		15	2		5.4				
378		491827	4048445	Westjazira/ Sweyhat	remote sensing		4	3		0.5				possible small mound
379		493159	4050272	Westjazira/ Sweyhat	remote sensing		7	2		14.5				
380		490140	4053212	Westjazira/ Sweyhat	remote sensing		15	1		7.0				
381		475540	4055642	Westjazira/ Sweyhat	remote sensing		16	1		22.8				
382		471746	4055343	Westjazira/ Sweyhat	remote sensing		8	1		3.1				
383		471944	4058610	Westjazira/ Sweyhat	remote sensing		4	2		0.2				possible small mound
386		435392	4067367	Westjazira/ Sweyhat	remote sensing		15	3		5.7				
387		437497	4066989	Westjazira/ Sweyhat	ground survey	27	4	0		0.6				
388		437516	4069101	Westjazira/ Sweyhat	remote sensing		14	2		1.0				
389		456470	4066197	Westjazira/ Sweyhat	remote sensing		14	2		1.4				
390		450069	4081266	Westjazira/ Sweyhat	remote sensing		14	2		3.5				
391		443757	4083254	Westjazira/ Sweyhat	remote sensing		2	1		6.6				extensive hollow ways
392		429897	4077169	Westjazira/ Sweyhat	remote sensing		16	3		6.1				
393	Keur Udanni	438716	4072458	Westjazira/ Sweyhat	remote sensing		15	3		10.1				toponym from "Carte du Levant"
394		493127	4037588	Westjazira/ Sweyhat	remote sensing		2	2		1.2				
395	Tell al-Sweyhat	496487	4031716	Westjazira/ Sweyhat	remote sensing		4	1		34.1				
396		496990	4030990	Westjazira/ Sweyhat	remote sensing		15	1		9.4				
401		497641	4031705	Westjazira/ Sweyhat	remote sensing		15	2		7.3				
402		484083	4031757	Westjazira/ Sweyhat	remote sensing		16	3		7.5				
407		493695	4023354	Westjazira/ Sweyhat	remote sensing		18	2		1.3				possibly with buildings on top
408		490417	4023982	Westjazira/ Sweyhat	remote sensing		1	1	ringwall settlement	4.6				

Table A.1 (continued)

Site ID	site name	UTM co-ordinates		survey area	source	ground survey's Site ID	site type code	clarity code	two-tiered fortified tell type	area (ha)	broad occupation periods	LC phases	EJZ phases	notes
		east	north											
409		491798	4048677	Westjazira/ Sweyhat	remote sensing		14	1		2.7				
410		438454	4070050	Westjazira/ Sweyhat	remote sensing		16	2		11.4				
411	Tell Jerniyeh	458002	4075599	Westjazira/ Sweyhat	ground survey	21	4	0		1.4				
412		444793	4073891	Westjazira/ Sweyhat	remote sensing		14	3		0.7				single building
414		430867	4074280	Westjazira/ Sweyhat	remote sensing		16	1		4.4				
415		421428	4065574	Westjazira/ Sweyhat	remote sensing		4	3		0.3				possible small mound
416		430527	4065526	Westjazira/ Sweyhat	remote sensing		14	1		0.4				single building
417		454565	4065946	Westjazira/ Sweyhat	remote sensing		4	2		5.8				
422		493702	4061332	Westjazira/ Sweyhat	remote sensing		15	1		11.4				extensive settlement
424		447793	4056620	Westjazira/ Sweyhat	remote sensing		8	1		4.2				
425		487336	4058105	Westjazira/ Sweyhat	remote sensing		4	2		2.4				possible small mound
426		478589	4055135	Westjazira/ Sweyhat	remote sensing		2	2		2.9				
427		437355	4050259	Westjazira/ Sweyhat	remote sensing		14	1		1.7				
428		493448	4048045	Westjazira/ Sweyhat	remote sensing		14	2		0.7				single building
430		475035	4037510	Westjazira/ Sweyhat	remote sensing		2	1		1.9				
431		456499	4033257	Westjazira/ Sweyhat	remote sensing		14	2		2.7				
432		463029	4034278	Westjazira/ Sweyhat	remote sensing		14	1		1.3				possibly by mound
435	Islamic-era Raqqa	467197	4036396	Westjazira/ Sweyhat	remote sensing		15	3		103.7				
436		464674	4031721	Westjazira/ Sweyhat	remote sensing		4	1		2.2				
445		473086	4030441	Westjazira/ Sweyhat	remote sensing		3	1	other	1.1				
446	Tell Serakrak	485911	4034636	Westjazira/ Sweyhat	ground survey		18	1		4.3	EBA, Iron Age			
447	Tell AHdar	482296	4032491	Westjazira/ Sweyhat	ground survey		2	2		7.7	EBA, Iron Age			
448	Tell Sanadib	478759	4035155	Westjazira/ Sweyhat	ground survey		4	2		1.5	EBA			
449	Tell Fatse north	485310	4035345	Westjazira/ Sweyhat	ground survey		18	2		1.3	EBA, Iron Age			

Table A.1 (continued)

Site ID	site name	UTM co-ordinates		survey area	source	ground survey's Site ID	site type code	clarity code	two-tiered fortified tell type	area (ha)	broad occupation periods	LC phases	EJZ phases	notes
		east	north											
450	Ras al-Ain	490281	4036117	Westjazira/ Sweyhat	ground survey		18	3		1.0	EBA			
451	Dab'a south	491306	4033546	Westjazira/ Sweyhat	ground survey		7	2		1.8	Iron Age			
452	dakhl	487961	4033191	Westjazira/ Sweyhat	ground survey		8	1		37.5	Iron Age			
453	kor dashan	490820	4033796	Westjazira/ Sweyhat	ground survey		12	3		2.6	Iron Age			
454	mankalli	496979	4030322	Westjazira/ Sweyhat	ground survey		4	3		27.2	Iron Age			
455	mazra'at mab'uja	501613	4034018	Westjazira/ Sweyhat	ground survey		16	3		2.6	Iron Age			
456	qala'at Hadid	499121	4029642	Westjazira/ Sweyhat	ground survey		4	1		0.9	Iron Age			
457	tell qrunful taHtani	498528	4025809	Westjazira/ Sweyhat	ground survey		4	2		0.4	Iron Age			
458	shnaina	492040	4026066	Westjazira/ Sweyhat	ground survey		4	2		2.0	Iron Age			
459	tell al-qadiriya southwest	489955	4024252	Westjazira/ Sweyhat	ground survey		14	3		0.6	Iron Age			single building
460	tell nu'amat	473504	4027984	Westjazira/ Sweyhat	ground survey		4	2		0.3	Iron Age			
461	tell qrunful fuqani	482363	4028197	Westjazira/ Sweyhat	ground survey		4	3		0.4	Iron Age			
462	Zirik	468774	4030041	Westjazira/ Sweyhat	ground survey		8	2		0.7	Iron Age			
463	tell Tukal	470548	4030158	Yale Khabur	ground survey	192	10	0		2.5	Palaeolithic, Ubaid, LC, EBA, Iron Age, Roman/Byzantine	1, 2, 3	3a, 3b	
464		464066	4024047	Yale Khabur	ground survey	192	5	0		12.6	Palaeolithic, Ubaid, LC, EBA, Iron Age, Roman/Byzantine		3a, 3b	
465	tell maddanah	466873	4030037	Yale Khabur	ground survey	201	10	0		0.6	Palaeolithic, EBA, Roman/Byzantine		3a, 3b	
466	tell khaznah	456607	4024791	Yale Khabur	ground survey	157	10	0		4.0	Halaf, EBA		1, 2, Final 2, 3a, 3b	
467	tell za'itr	448414	4030014	Yale Khabur	ground survey	99	18	0		1.7	Ubaid, EBA, Roman/Byzantine		1, 2, Final 2, 3a, 3b	
468	tell Tuaikil	433009	4022668	Yale Khabur	ground survey	193	4	0		4.5	EBA, Iron Age, Roman/Byzantine			
469		465304	4020249	Yale Khabur	ground survey	194	12	0		3.9	EBA, Roman/Byzantine		3a, 3b	
470		463974	4018616	Yale Khabur	ground survey	197	12	0		3.3	EBA, Roman/Byzantine		1, 2, Final 2	
471		493253	4022710	Yale Khabur	ground survey	197	14	0		34.8	EBA		1, 2, Final 2	
472	tell qashgha	491781	4023789	Yale Khabur	ground survey	168	10	0		4.0	EBA, Iron Age		1, 2, Final 2, 3a, 3b	
473		494342	4022574	Yale Khabur	ground survey	190	4	0		0.5	EBA		1, 2, Final 2	
474	tell hamam gharbi	499371	4023156	Yale Khabur	ground survey	162	10	0		22.5	EBA		1, 2, Final 2, 3a, 3b	
475		485290	4015720	Yale Khabur	ground survey	152	15	0		21.8	EBA, Iron Age, Roman/Byzantine			
476	khirbat ash-shiHa	474128	4016249	Yale Khabur	ground survey	153	8	0		3.3	EBA, Iron Age, Roman/Byzantine		1, 2, Final 2, 3a, 3b	
477		449608	4015251	Yale Khabur	ground survey	205	12	0		2.0	EBA		1, 2, Final 2	
478	tell al-gharah	457670	4014012	Yale Khabur	ground survey	204	4	0		1.9	EBA, Iron Age, Roman/Byzantine		1, 2, Final 2	
479	tell al-khalif	451744	4012788	Yale Khabur	ground survey	158	4	0		0.6	EBA		1, 2, Final 2, 3a, 3b	
480		457432	4014003	Yale Khabur	ground survey	207	4	0		2.2	EBA		1, 2, Final 2	
481	Tell Barud	436393	4016057	Yale Khabur	ground survey	49	2	0	other	2.9	EBA, Iron Age, Roman/Byzantine		3a, 3b	
482	tell makhrum	437653	4012853	Yale Khabur	ground survey	180	2	0		2.8	EBA, Iron Age		3a, 3b	
483	tell mabTu'a	433038	4014671	Yale Khabur	ground survey	175	2	0		2.4	EBA, Roman/Byzantine		1, 2, Final 2, 3a, 3b	

Table A.1 (continued)

Site ID	site name	UTM co-ordinates		survey area	source	ground survey's Site ID	site type code	clarity code	two-tiered fortified tell type	area (ha)	broad occupation periods	LC phases	EJZ phases	notes
		east	north											
484		431790	4013575	Yale Khabur	ground survey	175	5	0		5.5	EBA, Roman/Byzantine		1, 2, Final 2, 3a, 3b	
485	tell tuainan	431386	4008617	Yale Khabur	ground survey	181	2	0		1.6	EBA, Iron Age, Roman/Byzantine		1, 2, Final 2, 3a, 3b	
486	tell marthiya	432155	4008836	Yale Khabur	ground survey	184	2	0		2.6	EBA		1, 2, Final 2, 3a, 3b	
487	Tell Mityaha	462723	4002340	Yale Khabur	ground survey	183	17	0	ringwall settlement	2.6	EBA, Iron Age, Roman/Byzantine		1, 2, Final 2, 3a, 3b	
488	tell trumbah	455605	4000970	Yale Khabur	ground survey	179	12	0		4.1	EBA, Roman/Byzantine		1, 2, Final 2, 3a, 3b	
489	Tell Samad	437514	4002963	Yale Khabur	ground survey	187	2	0		0.4	EBA		1, 2, Final 2	
490	tell khnaizir	426823	4002727	Yale Khabur	ground survey	173	12	0		0.5	EBA		1, 2, Final 2	
491	tell burqa	431341	4001798	Yale Khabur	ground survey	174	4	0		1.0	EBA, Iron Age, Roman/Byzantine		1, 2, Final 2, 3a, 3b	
492		425387	4002756	Yale Khabur	ground survey	196	12	0		6.5	Iron Age			
493		435215	3996684	Yale Khabur	ground survey	191	4	0		3.8	Iron Age, Roman/Byzantine			
494	tell maraza	466794	3996325	Yale Khabur	ground survey	186	4	0		0.7	EBA, Iron Age			
495		483661	3997793	Yale Khabur	ground survey	198	4	0		2.1	Roman/Byzantine			
496		479743	3992436	Yale Khabur	ground survey	198	5	0		4.6	Roman/Byzantine			
497		499789	3987226	Yale Khabur	ground survey	198	14	0		1.1	Roman/Byzantine			single building
498		492648	3985874	Yale Khabur	ground survey	166	14	0		0.8	Roman/Byzantine			
499	maghlujah	480873	3989527	Yale Khabur	ground survey	35	4	0		3.9	Iron Age, Roman/Byzantine			
500		457828	3988900	Yale Khabur	remote sensing		4	2		14.6				
501	tell kidkane	457098	3987317	Yale Khabur	remote sensing		2	1		3.2				
507		456501	3987100	Yale Khabur	remote sensing		4	1		0.8				
508		454763	3980775	Yale Khabur	remote sensing		4	3		0.5				
509		466270	3980872	Yale Khabur	remote sensing		4	3		2.4				
510		471053	3984282	Yale Khabur	remote sensing		4	3		1.7				
511		499496	3982614	Yale Khabur	remote sensing		12	3		1.1				
512		489773	3984210	Yale Khabur	remote sensing		4	1		1.8				
513		430977	4065632	Yale Khabur	remote sensing		12	2		6.6				
514		486215	4047637	Yale Khabur	remote sensing		14	2		0.9				
515		488753	4051018	Yale Khabur	remote sensing		14	1		0.4				
516		444577	4023869	Yale Khabur	remote sensing		14	2		0.8				
517		488002	4048889	Yale Khabur	remote sensing		14	2		5.9				
518		477112	4049224	Yale Khabur	remote sensing		14	1		10.4				
519		440347	4055280	Yale Khabur	remote sensing		4	1		9.1				
520		477859	4053368	Yale Khabur	remote sensing		14	2		4.2				
521		482384	4048023	Yale Khabur	remote sensing		10	3		2.6				
522		491819	4022024	Yale Khabur	remote sensing		14	3		0.7				
523		486431	4050040	Yale Khabur	remote sensing		14	3		0.5				
524		476639	4054202	Yale Khabur	remote sensing		15	2		43.0				
525		432847	4069787	Yale Khabur	remote sensing		12	3		0.5				
526		580495	4057009	Yale Khabur	remote sensing		10	2		3.8				
527		595296	4059628	Yale Khabur	remote sensing		14	3		0.3				
528		582291	4058852	Yale Khabur	remote sensing		15	3		11.7				
529		582291	4058852	Yale Khabur	remote sensing		12	3		2.2				
530		582291	4058852	Yale Khabur	remote sensing		14	1		4.9				
531		587251	4042130	Yale Khabur	remote sensing		14	1		6.1				
532		628590	4034623	Yale Khabur	remote sensing		14	1		2.0				
536		585600	4065502	Yale Khabur	remote sensing		16	3		5.0				
537		588020	4064999	Yale Khabur	remote sensing		8	1		1.2				
538		594126	4063128	Yale Khabur	remote sensing		8	1		0.5				
539		592802	4063110	Yale Khabur	remote sensing		14	1		0.9				

Table A.1 (continued)

Site ID	site name	UTM co-ordinates east	UTM co-ordinates north	survey area	source	ground survey's Site ID	site type code	clarity code	two-tiered fortified tell type	area (ha)	broad occupation periods	LC phases	EJZ phases	notes
540		593554	4061779	Yale Khabur	remote sensing		14	1		3.3				
541		594957	4061958	Yale Khabur	remote sensing		14	2		0.3				
542		592716	4059986	Yale Khabur	remote sensing		5	3		13.1				
543		590755	4061162	Yale Khabur	remote sensing		14	3		0.7				
544		584099	4061106	Yale Khabur	remote sensing		12	3		2.4				
545		584319	4061173	Yale Khabur	remote sensing		14	1		0.5				single building
546		588956	4062736	Yale Khabur	remote sensing		12	2		0.2				
547		582654	4060777	Yale Khabur	remote sensing		8	1		0.5				
548		577700	4060775	Yale Khabur	remote sensing		5	1		1.6				
549		576005	4055814	Yale Khabur	remote sensing		14	1		0.4				single building
550		576066	4059245	Yale Khabur	remote sensing		14	1		1.0				
551		577654	4057469	Yale Khabur	remote sensing		12	2		3.4				
552		580603	4058602	Yale Khabur	remote sensing		14	1		1.8				
553		578573	4056627	Yale Khabur	remote sensing		14	1		1.1				single building
554		578730	4057875	Yale Khabur	remote sensing		12	3		0.7				possible small mound
555		585754	4055636	Yale Khabur	remote sensing		12	3		0.5				possible small mound
556		589287	4058384	Yale Khabur	remote sensing		17	2	Matin variety	1.7				with possible wall remnants
557		585653	4056671	Yale Khabur	remote sensing		12	2		0.4				possible small mound
558		585370	4058326	Yale Khabur	remote sensing		14	3		0.4				
559		587713	4058321	Yale Khabur	remote sensing		14	1		0.6				
560		589009	4057926	Yale Khabur	remote sensing		12	3		0.5				
561		591107	4057594	Yale Khabur	remote sensing		14	2		0.7				single building
562		596212	4059185	Yale Khabur	remote sensing		10	2		2.1				
563		596816	4057027	Yale Khabur	remote sensing		4	2		0.5				possible small mound
564		617965	4051597	Yale Khabur	remote sensing		12	1		2.4				
569		619740	4053456	Yale Khabur	remote sensing		14	2		14.8				
575		613568	4051294	Yale Khabur	remote sensing		14	2		0.6				
577		600465	4051812	Yale Khabur	remote sensing		14	2		1.2				
578		598761	4052495	Yale Khabur	remote sensing		4	2		0.4				
579		594700	4054007	Yale Khabur	remote sensing		14	1		0.1				single building
580		591672	4054475	Yale Khabur	remote sensing		14	3		0.2				single building
581		592975	4050717	Yale Khabur	remote sensing		10	2		1.8				
582		581541	4053736	Yale Khabur	remote sensing		5	3		0.3				single building
583		579348	4051280	Yale Khabur	remote sensing		14	3		0.5				
584		580985	4051766	Yale Khabur	remote sensing		4	3		0.4				
585		579992	4051433	Yale Khabur	remote sensing		14	1		0.3				
586		578691	4052169	Yale Khabur	remote sensing		14	1		0.2				single building
587		577834	4053306	Yale Khabur	remote sensing		8	1		7.3				
588		572197	4052306	Yale Khabur	remote sensing		4	3		0.1				with possible wall remnants
589		570725	4047236	Yale Khabur	remote sensing		14	1		0.7				single building
590		582131	4046944	Yale Khabur	remote sensing		18	3		1.7				
591		580756	4047254	Yale Khabur	remote sensing		4	2		0.5				
592		577529	4047576	Yale Khabur	remote sensing		14	2		2.9				
593		592383	4048946	Yale Khabur	remote sensing		4	2		0.5				
594		598312	4048673	Yale Khabur	remote sensing		15	2		3.7				
595		609755	4048034	Yale Khabur	remote sensing		14	1		1.8				single building
596		604856	4046715	Yale Khabur	remote sensing		2	3		0.9				
597		615543	4047073	Yale Khabur	remote sensing		4	3		0.4				
598		612867	4048706	Yale Khabur	remote sensing		14	1		0.2				single building, at least

Table A.1 (continued)

Site ID	site name	UTM co-ordinates		survey area	source	ground survey's Site ID	site type code	clarity code	two-tiered fortified tell type	area (ha)	broad occupation periods	LC phases	EJZ phases	notes
		east	north											
599		613665	4047236	Yale Khabur	remote sensing		14	1		1.2				
600		622192	4048048	Yale Khabur	remote sensing		14	1		0.6				
601		624130	4045578	Yale Khabur	remote sensing		14	3		0.3				single building
602		628947	4046242	Yale Khabur	remote sensing		17	2	other	2.9				with possible wall remnants
603		622925	4046026	Yale Khabur	remote sensing		14	2		0.7				single building, at least
604		645067	4041105	Yale Khabur	remote sensing		4	1		2.6				
612		623121	4042208	Yale Khabur	remote sensing		14	1		0.4				
613		616273	4042913	Yale Khabur	remote sensing		14	1		0.2				
615		606212	4042242	Yale Khabur	remote sensing		5	3		3.1				
616		607022	4042837	Yale Khabur	remote sensing		4	2		3.2				with possible lower town settlement
617		596127	4043212	Yale Khabur	remote sensing		4	2		1.0				possible small mound
618		595984	4043182	Yale Khabur	remote sensing		15	2		4.4				
619		591638	4042376	Yale Khabur	remote sensing		15	1		24.7				
620		576597	4041418	Yale Khabur	remote sensing		14	1		0.2				
621		567885	4039283	Yale Khabur	remote sensing		4	3		0.4				
622		572008	4038454	Yale Khabur	remote sensing		15	3		2.0				
623		572680	4037153	Yale Khabur	remote sensing		4	2		0.6				
624		575706	4036267	Yale Khabur	remote sensing		4	3		0.1				possible small mound
625		587453	4039119	Yale Khabur	remote sensing		4	2		0.2				3 small mounds in a line
626		588251	4039045	Yale Khabur	remote sensing		14	1		0.8				large single building
627		590099	4035334	Yale Khabur	remote sensing		10	2		0.3				
628		604096	4038065	Yale Khabur	remote sensing		16	3		2.7				
629		606809	4039834	Yale Khabur	remote sensing		16	3		1.0				
630		608778	4036992	Yale Khabur	remote sensing		18	2		0.5				
631		614408	4037114	Yale Khabur	remote sensing		4	2		0.3				
632		618086	4036793	Yale Khabur	remote sensing		4	3		1.2				
633		617239	4039710	Yale Khabur	remote sensing		4	2		1.1				possible small mound
634		624550	4035659	Yale Khabur	remote sensing		10	2		2.4				
635		628750	4037363	Yale Khabur	remote sensing		10	3		4.8				
636		643185	4039078	Yale Khabur	remote sensing		4	3		0.2				possible small mound
637		638182	4037120	Yale Khabur	remote sensing		4	2		0.4				
638		637825	4038611	Yale Khabur	remote sensing		4	1		0.4				
639		642063	4039120	Yale Khabur	remote sensing		4	2		2.7				possible small mound
640		644504	4035612	Yale Khabur	remote sensing		14	2		0.5				single building
641		661027	4031921	Yale Khabur	remote sensing		2	1		0.8				
642		657737	4032470	Yale Khabur	remote sensing		2	2		0.6				
643		649053	4031351	Yale Khabur	remote sensing		4	2		0.3				
644		625122	4034817	Yale Khabur	remote sensing		4	3		0.4				
645		633095	4034542	Yale Khabur	remote sensing		4	3		0.4				
646		619728	4034855	Yale Khabur	remote sensing		4	2		0.2				
647		606301	4033341	Yale Khabur	remote sensing		3	3		0.2				
648		608311	4032905	Yale Khabur	remote sensing		3	3		0.2				
653		597185	4034673	Yale Khabur	remote sensing		14	1		13.3				single building, at least
658		596437	4035632	Yale Khabur	remote sensing		12	1		1.6				
659		586278	4033523	Yale Khabur	remote sensing		14	1		0.1				single building
660		586871	4033539	Yale Khabur	remote sensing		15	1		0.2				possibly modern
661		583076	4035408	Yale Khabur	remote sensing		5	1		0.4				
662		578447	4033438	Yale Khabur	remote sensing		4	3		1.6				
663		579229	4032533	Yale Khabur	remote sensing		4	2		0.2				

Table A.1 (continued)

Site ID	site name	UTM co-ordinates east	UTM co-ordinates north	survey area	source	ground survey's Site ID	site type code	clarity code	two-tiered fortified tell type	area (ha)	broad occupation periods	LC phases	EJZ phases	notes
664		572147	4033412	Yale Khabur	remote sensing		10	2		0.4				
665		571108	4033875	Yale Khabur	remote sensing		12	2		1.3				
666		563163	4034567	Yale Khabur	remote sensing		4	3		0.4				on a ridge
667		562795	4034496	Yale Khabur	remote sensing		15	3		0.2				single building
668		563022	4032208	Yale Khabur	remote sensing		4	2		0.4				
669		561501	4030773	Yale Khabur	remote sensing		18	2		1.6				
670		581823	4030069	Yale Khabur	remote sensing		15	1		0.5				single building
671		582495	4028601	Yale Khabur	remote sensing		18	3		1.7				possible small mound
672		601196	4027014	Yale Khabur	remote sensing		14	2		0.5				
673		601201	4029623	Yale Khabur	remote sensing		4	3		0.8				
674		620925	4026053	Yale Khabur	remote sensing		4	2		0.6				possible small mound
675		618576	4027227	Yale Khabur	remote sensing		15	1		81.1				
676		618379	4030090	Yale Khabur	remote sensing		18	2		2.8				
677		628167	4028641	Yale Khabur	remote sensing		18	1		6.3				
678		628549	4028037	Yale Khabur	remote sensing		4	2		0.6				possible small mound
679		628557	4028604	Yale Khabur	remote sensing		4	2		0.3				
680		633652	4026691	Yale Khabur	remote sensing		15	3		6.8				
681		640100	4026306	Yale Khabur	remote sensing		4	1		1.0				
682		637792	4028088	Yale Khabur	remote sensing		4	2		0.1				
683		637702	4027833	Yale Khabur	remote sensing		4	2		0.2				possible small mound
684		642028	4029897	Yale Khabur	remote sensing		4	1		0.4				possible small mound
685		660182	4027906	Yale Khabur	remote sensing		4	1		0.4				possible small mound
686		650621	4023375	Yale Khabur	remote sensing		4	2		0.4				possible small mound
690		647647	4021253	Yale Khabur	remote sensing		4	2		0.2				possible small mound
691		650183	4025362	Yale Khabur	remote sensing		10	2		1.2				
692		639151	4025890	Yale Khabur	remote sensing		4	1		0.3				
693		628969	4021471	Yale Khabur	remote sensing		4	2		0.4				
694		620812	4021850	Yale Khabur	remote sensing		4	1		0.7				
695		615047	4025210	Yale Khabur	remote sensing		13	1		27.7				
696		615751	4021257	Yale Khabur	remote sensing		18	2		3.2				
697		586419	4025177	Yale Khabur	remote sensing		4	2		1.0				
698		586559	4024496	Yale Khabur	remote sensing		14	3		44.7				
699		568372	4024324	Yale Khabur	remote sensing		14	2		4.6				
700		631617	4019476	Yale Khabur	remote sensing		4	2		2.0				
701		638685	4019157	Yale Khabur	remote sensing		14	1		0.2				single building
702		654290	4012073	Yale Khabur	remote sensing		14	2		0.2				single building
703		644058	4012895	Yale Khabur	remote sensing		14	2		2.6				
704		635462	4014953	Yale Khabur	remote sensing		14	3		0.4				
705		623965	4014440	Yale Khabur	remote sensing		4	2		0.3				possible small mound
706		618999	4013434	Yale Khabur	remote sensing		14	3		1.7				
707		615636	4014442	Yale Khabur	remote sensing		14	2		1.3				
708		595238	4011613	Yale Khabur	remote sensing		14	3		2.4				
709		582980	4011248	Yale Khabur	remote sensing		15	3		3.9				
710		579451	4015459	Yale Khabur	remote sensing		15	3		2.1				
711		610025	4009366	Yale Khabur	remote sensing		16	2		4.7				
712		620482	4010284	Yale Khabur	remote sensing		14	3		1.9				
713		641857	4007916	Yale Khabur	remote sensing		15	3		7.9				
714		641173	4010263	Yale Khabur	remote sensing		15	3		3.2				
715		638015	4010852	Yale Khabur	remote sensing		15	3		1.9				

Table A.1 (continued)

Site ID	site name	UTM co-ordinates		survey area	source	ground survey's Site ID	site type code	clarity code	two-tiered fortified tell type	area (ha)	broad occupation periods	LC phases	EJZ phases	notes
		east	north											
716		639143	4010994	Yale Khabur	remote sensing		14	3		5.6				
717		647513	4007313	unsurveyed	remote sensing		8	1		14.0				
718		642500	4004814	unsurveyed	remote sensing		4	1		1.7				
719		625891	4003964	unsurveyed	remote sensing		4	2		0.5				
720		618345	4006358	unsurveyed	remote sensing		8	2		1.8				
722		618692	4003436	unsurveyed	remote sensing		14	1		1.4				
723		618523	4003152	unsurveyed	remote sensing		14	2		0.4				
724		613976	4003130	unsurveyed	remote sensing		14	2		2.5				
725		614759	4002560	unsurveyed	remote sensing		17	3	other	1.4				
726		610187	4005435	unsurveyed	remote sensing		2	2		0.9				
728		592332	3998235	unsurveyed	remote sensing		16	3		3.9				
729		636457	3997782	unsurveyed	remote sensing		14	1		8.2				
730		644012	4001429	unsurveyed	remote sensing		4	3		1.1				
731		632131	3995690	unsurveyed	remote sensing		4	3		2.2				
732		619492	3995922	unsurveyed	remote sensing		14	1		2.6				
733	Kharab 'Arnan	613204	3993894	unsurveyed	remote sensing		15	1		49.4				with enclosing wall
734		600824	3994953	unsurveyed	remote sensing		8	2		5.0				
738		599485	3994806	unsurveyed	remote sensing		15	3		6.8				
742		625459	3991238	unsurveyed	remote sensing		4	3		1.2				
743		636241	3989603	unsurveyed	remote sensing		14	2		14.0				
744		640474	3987842	unsurveyed	remote sensing		18	3		0.8				
745		637589	3987886	unsurveyed	remote sensing		4	3		1.6				
746		638421	3987669	unsurveyed	remote sensing		14	1		2.1				
747		639614	3991553	unsurveyed	remote sensing		10	3		4.7				
748		638327	3992117	unsurveyed	remote sensing		8	1		2.1				
749		645691	3988206	unsurveyed	remote sensing		15	1		101.8				with partial enclosing wall
750		645883	3989956	unsurveyed	remote sensing		4	1		1.1				
751		647102	3988799	unsurveyed	remote sensing		14	2		0.5				
752		640499	3987434	unsurveyed	remote sensing		14	1		0.7				
753		598638	4079120	unsurveyed	remote sensing		14	2		0.6				
754		598608	4077986	unsurveyed	remote sensing		14	1		0.4				
755		599457	4077947	unsurveyed	remote sensing		8	1		8.0				
756		600462	4074539	unsurveyed	remote sensing		14	1		10.8				
757		601515	4073393	unsurveyed	remote sensing		8	2		3.3				
758		598299	4074317	unsurveyed	remote sensing		14	1		3.4				
759		586488	4072727	unsurveyed	remote sensing		14	3		0.3				
760		591513	4072676	unsurveyed	remote sensing		14	2		6.3				
761		598638	4072928	unsurveyed	remote sensing		14	1		0.5				
762		587325	4071488	unsurveyed	remote sensing		8	1		7.0				
763		583347	4071218	unsurveyed	remote sensing		17	3	ringwall settlement	4.8				
764		578097	4069328	unsurveyed	remote sensing		8	2		3.8				
765		580020	4069409	unsurveyed	remote sensing		14	1		6.4				
766		581250	4069775	unsurveyed	remote sensing		16	1		7.7				
767		589893	4069328	unsurveyed	remote sensing		14	1		0.7				
768		599784	4069457	unsurveyed	remote sensing		12	2		27.2				
769		593157	4067909	unsurveyed	remote sensing		12	3		17.6				
770		589629	4067462	unsurveyed	remote sensing		14	1		0.6				
771		587112	4068428	unsurveyed	remote sensing		14	1		1.5				

Table A.1 (continued)

Site ID	site name	UTM co-ordinates east	UTM co-ordinates north	survey area	source	ground survey's Site ID	site type code	clarity code	two-tiered fortified tell type	area (ha)	broad occupation periods	LC phases	EJZ phases	notes
772		581007	4068164	unsurveyed	remote sensing		14	1		0.5				
773		563097	4066784	unsurveyed	remote sensing		8	3		1.0				
774		562647	4066412	unsurveyed	remote sensing		15	1		31.0				
775		567708	4066091	unsurveyed	remote sensing		14	1		12.4				
776		584064	4066352	unsurveyed	remote sensing		14	1		1.0				
777		588441	4066748	unsurveyed	remote sensing		15	1		9.7				
778		579177	4064570	unsurveyed	remote sensing		14	1		1.9				
779		577041	4065224	unsurveyed	remote sensing		14	1		2.6				
780		576183	4064699	unsurveyed	remote sensing		14	1		2.8				
781		575715	4065665	unsurveyed	remote sensing		8	2		9.2				
782		573897	4064582	unsurveyed	remote sensing		14	1		11.4				
783		569040	4065236	unsurveyed	remote sensing		14	1		0.3				
784		567576	4065080	unsurveyed	remote sensing		14	1		1.3				
785		567141	4065632	unsurveyed	remote sensing		14	2		0.8				
786		565845	4065686	unsurveyed	remote sensing		12	3		1.8				
787		564417	4065035	unsurveyed	remote sensing		14	1		9.4				
788		555453	4064009	unsurveyed	remote sensing		14	2		1.3				
789		557277	4063124	unsurveyed	remote sensing		14	1		1.0				
790		561105	4063841	unsurveyed	remote sensing		14	2		1.0				
791		562950	4064069	unsurveyed	remote sensing		14	1		8.0				single large building
792		568539	4063679	unsurveyed	remote sensing		14	2		11.2				
793		569547	4063625	unsurveyed	remote sensing		14	1		0.9				
794		572166	4064192	unsurveyed	remote sensing		14	2		0.4				
795		576567	4064123	unsurveyed	remote sensing		14	2		0.3				
796		573600	4062254	unsurveyed	remote sensing		14	2		0.4				
797		573360	4061756	unsurveyed	remote sensing		14	1		0.2				
798		572223	4062026	unsurveyed	remote sensing		14	1		8.2				many individual single buildings in the vicinity
799		566076	4061927	unsurveyed	remote sensing		14	1		2.8				many individual single buildings in the vicinity
800		561708	4061525	unsurveyed	remote sensing		14	1		2.8				many individual single buildings in the vicinity
801		560865	4062572	unsurveyed	remote sensing		12	2		7.5				
802		558672	4062782	unsurveyed	remote sensing		14	2		0.6				many individual single buildings in the vicinity
803		556047	4062524	unsurveyed	remote sensing		14	1		0.8				many individual single buildings in the vicinity
804		559692	4060154	unsurveyed	remote sensing		15	1		22.3				
805		560559	4060805	unsurveyed	remote sensing		14	2		0.5				single building
806		566388	4061078	unsurveyed	remote sensing		14	2		0.3				single building
807		567315	4060754	unsurveyed	remote sensing		14	2		0.3				single building
808		570063	4061384	unsurveyed	remote sensing		14	2		0.8				single building
809		572148	4061003	unsurveyed	remote sensing		8	1		2.0				
810		575781	4060946	unsurveyed	remote sensing		14	1		1.2				
811		573285	4059842	unsurveyed	remote sensing		14	1		0.4				single building
812		564867	4058684	unsurveyed	remote sensing		14	1		2.3				
813		561606	4057625	Wadi Hamar	remote sensing		8	1		8.3				
814		564474	4057358	Wadi Hamar	remote sensing		14	2		1.5				in the Turkish-Syrian border no-man's land
815		566769	4057802	Wadi Hamar	remote sensing		14	2		4.5				
816		569277	4058285	Wadi Hamar	remote sensing		14	2		0.3				single building
817		571056	4058057	Wadi Hamar	remote sensing		14	1		4.6				one of the buildings has internal walls
818		572712	4058309	Wadi Hamar	remote sensing		17	1	ringwall settlement	3.9				four sections of a possible outer wall; possible interspersing gates

Table A.1 (continued)

Site ID	site name	UTM co-ordinates east	north	survey area	source	ground survey's Site ID	site type code	clarity code	two-tiered fortified tell type	area (ha)	broad occupation periods	LC phases	EJZ phases	notes
819		571125	4056317	Wadi Hamar	remote sensing		4	3		2.6				
820		566799	4056452	unsurveyed	remote sensing		12	2		8.5				
821		565716	4056944	unsurveyed	remote sensing		14	3		3.8				
822		564723	4056614	unsurveyed	remote sensing		14	2		7.6				
823		562761	4056302	unsurveyed	remote sensing		15	1		17.7				
824		564000	4054880	unsurveyed	remote sensing		8	1		7.4				
828		569835	4055537	unsurveyed	remote sensing		14	2		1.1				
829		570174	4052996	unsurveyed	remote sensing		14	1		19.9				
830		566934	4053092	unsurveyed	remote sensing		4	1		2.8				in Turkey
831		563919	4053641	unsurveyed	remote sensing		5	1		6.1				in Turkey
832		564126	4051532	unsurveyed	remote sensing		8	2		5.2				
833		568923	4050683	unsurveyed	remote sensing		14	2		4.6				
836		566316	4049975	unsurveyed	remote sensing		4	1		4.9				in Turkey
837		569352	4049165	unsurveyed	remote sensing		5	1		23.4				in the Turkish-Syrian border no-man's land
838		568371	4048133	unsurveyed	remote sensing		15	3		8.7				
839		565575	4044176	unsurveyed	remote sensing		14	2		1.4				
840		564417	4041113	unsurveyed	remote sensing		15	1		8.0				
841		557760	4039085	unsurveyed	remote sensing		14	2		5.7				
842		551040	4036817	unsurveyed	remote sensing		4	1		1.7				
843		537954	4060169	unsurveyed	remote sensing		5	2		19.3				
844		526806	4059803	Wadi Hamar	remote sensing		14	1		22.6				
845		540132	4059962	Wadi Hamar	remote sensing		14	2		2.7				
846		538467	4058102	Wadi Hamar	remote sensing		14	2		2.5				
847		524853	4058135	Wadi Hamar	remote sensing		15	1		8.1				
848		520053	4057598	Wadi Hamar	remote sensing		14	1		2.4				
849		516105	4058105	Wadi Hamar	remote sensing		4	3		1.6				
850		512853	4058459	Wadi Hamar	remote sensing		4	3		2.7				
851		508014	4058249	unsurveyed	remote sensing		15	3		2.3				with a possible tell
852		504300	4057769	unsurveyed	remote sensing		15	2		5.9				
853		504267	4061279	unsurveyed	remote sensing		14	1		0.4				
854		509493	4060649	unsurveyed	remote sensing		15	2		13.9				
855		506562	4061561	unsurveyed	remote sensing		15	2		4.8				
856		505860	4061561	unsurveyed	remote sensing		14	1		0.6				
857		503826	4062479	unsurveyed	remote sensing		14	1		0.2				
858		503013	4056665	unsurveyed	remote sensing		14	3		5.5				
859		513915	4056392	unsurveyed	remote sensing		15	2		7.6				
860		517446	4057205	unsurveyed	remote sensing		15	1		16.3				
861		523077	4056089	unsurveyed	remote sensing		4	2		2.0				
862		523059	4055732	unsurveyed	remote sensing		14	1		2.5				
863		524973	4057202	unsurveyed	remote sensing		18	2		0.7				
864		531435	4056746	unsurveyed	remote sensing		14	2		1.0				single building
867		538701	4057241	unsurveyed	remote sensing		15	2		17.7				
868		532947	4055552	unsurveyed	remote sensing		8	2		0.4				
869		533730	4055522	unsurveyed	remote sensing		4	1		0.9				
870		526881	4055102	unsurveyed	remote sensing		5	1		14.9				
871		526572	4055057	unsurveyed	remote sensing		14	3		7.2				
872		520194	4055645	unsurveyed	remote sensing		4	1		2.0				
873		518949	4054988	Wadi Hamar	remote sensing		14	2		0.3				single building
874		518832	4054649	Wadi Hamar	remote sensing		14	1		0.2				single building

Table A.1 (continued)

Site ID	site name	UTM co-ordinates		survey area	source	ground survey's Site ID	site type code	clarity code	two-tiered fortified tell type	area (ha)	broad occupation periods	LC phases	EJZ phases	notes
		east	north											
875		515808	4054484	Wadi Hamar	remote sensing		8	2		0.9				
876		515796	4055486	Wadi Hamar	remote sensing		15	2		8.2				
877		514680	4054679	Wadi Hamar	remote sensing		14	2		11.0				
878		512787	4055504	Wadi Hamar	remote sensing		14	1		0.9				
879		513000	4054502	Wadi Hamar	remote sensing		4	2		0.3				
880		510390	4054298	unsurveyed	remote sensing		8	1		2.4				
881		509400	4054361	unsurveyed	remote sensing		14	1		0.7				
882		508953	4055441	unsurveyed	remote sensing		14	2		5.8				
883		505677	4054439	unsurveyed	remote sensing		4	1		1.5				
884		502032	4054994	unsurveyed	remote sensing		14	3		0.6				
885		502785	4055675	unsurveyed	remote sensing		14	1		6.6				
886		504126	4053311	unsurveyed	remote sensing		14	1		10.7				
887		506511	4054064	unsurveyed	remote sensing		8	2		2.6				
888		513885	4053113	unsurveyed	remote sensing		14	1		0.3				single building
890		514188	4053170	unsurveyed	remote sensing		15	1		14.1				
891		516213	4053224	unsurveyed	remote sensing		14	1		0.3				single building
892		521418	4054010	unsurveyed	remote sensing		14	1		0.5				single building
893		525426	4054085	unsurveyed	remote sensing		14	2		0.4				single building
894		528183	4053317	unsurveyed	remote sensing		14	1		13.0				single building
895		527559	4053719	unsurveyed	remote sensing		14	1		0.5				single building
896		529176	4053038	unsurveyed	remote sensing		14	1		0.3				single building
897		533268	4053428	unsurveyed	remote sensing		14	1		4.3				single building
898		534273	4053305	unsurveyed	remote sensing		14	1		0.3				single building
899		535323	4052141	unsurveyed	remote sensing		14	2		0.5				
900		523743	4051973	unsurveyed	remote sensing		15	1		5.2				
901		520692	4052690	unsurveyed	remote sensing		4	2		0.3				
902		520209	4052720	unsurveyed	remote sensing		4	3		0.2				
903		516399	4052789	unsurveyed	remote sensing		8	2		4.8				
904		515016	4052864	unsurveyed	remote sensing		15	2		7.5				
905		512496	4051712	unsurveyed	remote sensing		4	3		1.1				
906		510801	4052519	unsurveyed	remote sensing		15	2		5.4				
907		506106	4051931	unsurveyed	remote sensing		15	1		19.1				
908		502911	4052924	unsurveyed	remote sensing		4	3		7.2				
909		503529	4050998	unsurveyed	remote sensing		8	1		2.9				
910		507474	4050497	unsurveyed	remote sensing		14	2		0.4				possibly a single building
911		507663	4051379	unsurveyed	remote sensing		15	2		4.7				
912		512119	4051046	unsurveyed	remote sensing		14	1		0.5				single building
913		524872	4050096	unsurveyed	remote sensing		14	1		1.1				
914		536136	4050751	unsurveyed	remote sensing		15	1		2.2				faint; under modern village
915		536274	4049860	unsurveyed	remote sensing		8	2		6.6				
916		536130	4049449	unsurveyed	remote sensing		4	1		0.9				
918		530514	4048876	unsurveyed	remote sensing		12	2		0.8				
919		530061	4048519	unsurveyed	remote sensing		14	1		0.4				
920		527505	4049296	unsurveyed	remote sensing		14	1		0.3				
921		511044	4049878	unsurveyed	remote sensing		14	1		6.1				
922		510837	4049719	unsurveyed	remote sensing		14	1		0.6				single building
923		510177	4049305	unsurveyed	remote sensing		15	1		7.1				
924		503658	4048927	unsurveyed	remote sensing		14	1		0.3				
925		505320	4048723	unsurveyed	remote sensing		14	1		4.3				

Table A.1 (continued)

Site ID	site name	UTM co-ordinates east	UTM co-ordinates north	survey area	source	ground survey's Site ID	site type code	clarity code	two-tiered fortified tell type	area (ha)	broad occupation periods	LC phases	EJZ phases	notes
926		507288	4047397	unsurveyed	remote sensing		14	1		3.1				
927		517215	4048255	unsurveyed	remote sensing		14	1		5.4				single building
928		519291	4048225	unsurveyed	remote sensing		14	2		0.3				single building
929		521652	4047664	unsurveyed	remote sensing		14	1		4.9				single building
930		537102	4048066	unsurveyed	remote sensing		14	1		0.4				single building
931	Medinet al-Far	537246	4046647	unsurveyed	remote sensing		13	1		110.7				
934		535737	4046332	unsurveyed	remote sensing		8	1		13.2				undulating surface
935		516465	4046290	unsurveyed	remote sensing		12	1		2.0				
936		511872	4046107	unsurveyed	remote sensing		14	1		0.6				single building
937		509622	4044775	unsurveyed	remote sensing		15	1		13.5				
938		513522	4045114	unsurveyed	remote sensing		8	2		0.6				2 small elliptical mounds
939		522576	4044433	unsurveyed	remote sensing		14	1		0.5				
940		530058	4044286	unsurveyed	remote sensing		4	2		0.6				
941		532212	4045159	unsurveyed	remote sensing		14	1		3.6				
942		534885	4044655	unsurveyed	remote sensing		12	2	ringwall settlement	0.6				
943		532482	4044586	unsurveyed	remote sensing		14	1		0.3				single building
944		538149	4044412	unsurveyed	remote sensing		4	3		0.5				
945		537837	4043860	unsurveyed	remote sensing		14	1		0.4				single building
946		534561	4043536	unsurveyed	remote sensing		12	3		1.5				
947		525942	4044004	unsurveyed	remote sensing		12	3		2.5				
948		523104	4043794	unsurveyed	remote sensing		4	2		0.5				
949		520719	4044355	unsurveyed	remote sensing		8	2		0.8				vaguely circular
953		510252	4043653	unsurveyed	remote sensing		15	2		69.3				
954		510729	4041832	unsurveyed	remote sensing		12	2		1.1				
955		516567	4042615	unsurveyed	remote sensing		14	1		0.7				single building
956		521586	4040995	unsurveyed	remote sensing		14	1		0.2				single building
957		525531	4041721	unsurveyed	remote sensing		14	2		9.3				
958		533469	4042570	unsurveyed	remote sensing		12	2		0.3				
959		536799	4042363	unsurveyed	remote sensing		1	2	Matin variety	3.1				
960		537105	4042552	unsurveyed	remote sensing		12	3		1.4				
961		536040	4040995	unsurveyed	remote sensing		14	2		0.6				
962		532644	4040992	unsurveyed	remote sensing		15	2		18.0				
963		532161	4040032	unsurveyed	remote sensing		14	1		4.9				
964		533976	4040245	unsurveyed	remote sensing		14	1		6.2				
965		530223	4040230	unsurveyed	remote sensing		14	1		0.5				single building
966		517407	4040173	unsurveyed	remote sensing		8	2		0.8				several small mounds
967		515610	4041157	unsurveyed	remote sensing		4	1		0.2				
968		512922	4040221	unsurveyed	remote sensing		2	3		3.0				
969		510147	4040680	unsurveyed	remote sensing		17	3	true Kranzhügel	6.2				
970		511080	4038487	unsurveyed	remote sensing		18	3		1.4				
971		511614	4038820	unsurveyed	remote sensing		8	3		0.5				several possible features
972		517071	4039744	unsurveyed	remote sensing		14	1		0.3				single building
973		519408	4039948	unsurveyed	remote sensing		4	2		0.8				several small mounds
974		519111	4038691	unsurveyed	remote sensing		4	2		1.8				several small mounds
975		522387	4038964	unsurveyed	remote sensing		18	3		6.1				
979		527913	4039069	unsurveyed	remote sensing		12	3		5.0				
980		529950	4038562	unsurveyed	remote sensing		14	1		0.5				single building

Table A.1 (continued)

Site ID	site name	UTM co-ordinates		survey area	source	ground survey's Site ID	site type code	clarity code	two-tiered fortified tell type	area (ha)	broad occupation periods	LC phases	EJZ phases	notes
		east	north											
981		531450	4039057	unsurveyed	remote sensing		4	2	Matin variety	1.6				
982		532446	4039120	unsurveyed	remote sensing		14	1		0.3				
983		534780	4039645	unsurveyed	remote sensing		14	2		0.4				single building
984		536574	4039729	unsurveyed	remote sensing		8	3		2.9				
985		538074	4037557	unsurveyed	remote sensing		14	1		0.4				single building
986		536340	4037548	unsurveyed	remote sensing		8	1		0.2				
987		518364	4037959	unsurveyed	remote sensing		14	2		35.3				large square enclosure
988		518286	4037368	unsurveyed	remote sensing		14	1		0.5				single building
989		517625	4035945	unsurveyed	remote sensing		12	2		0.5				
990		521264	4036299	unsurveyed	remote sensing		14	2		2.5				
991		525935	4036236	unsurveyed	remote sensing		1	2	Matin variety	4.3				
992		535238	4036287	unsurveyed	remote sensing		8	2		1.0				
993		538604	4034962	unsurveyed	remote sensing		14	2		1.2				single building
994		521648	4034359	unsurveyed	remote sensing		15	1		5.2				
995		534347	4032787	unsurveyed	remote sensing		14	3		13.5				
997		554348	4034002	unsurveyed	remote sensing		14	1		1.3				
998		526310	4032025	unsurveyed	remote sensing		18	3		0.7				
999		524522	4032034	unsurveyed	remote sensing		14	1		3.2				single building
1000		520463	4032301	unsurveyed	remote sensing		10	3		1.9				
1001		513872	4032751	unsurveyed	remote sensing		10	2		0.7				
1002		510590	4031799	unsurveyed	remote sensing		4	3		0.4				
1003		518393	4030143	unsurveyed	remote sensing		12	1		0.3				
1004		549233	4028787	unsurveyed	remote sensing		14	2		0.7				
1008		544079	4029240	unsurveyed	remote sensing		12	3		0.2				
1009		538622	4029060	unsurveyed	remote sensing		14	3		0.1				single building
1010		527759	4028577	unsurveyed	remote sensing		4	3		0.1				
1011		517067	4028442	unsurveyed	remote sensing		12	3		0.5				
1012		510539	4029714	unsurveyed	remote sensing		14	2		0.1				single building
1013		523658	4028139	unsurveyed	remote sensing		10	2		1.1				
1014		529550	4028151	unsurveyed	remote sensing		4	3		0.2				
1015		537530	4027128	unsurveyed	remote sensing		4	2		0.2				
1016		537725	4027326	unsurveyed	remote sensing		4	3		0.3				
1017		544610	4027275	unsurveyed	remote sensing		12	2		0.2				
1018		552893	4028106	unsurveyed	remote sensing		4	3		0.2				
1019		513752	4026858	unsurveyed	remote sensing		12	1		0.5				
1020		511532	4026909	unsurveyed	remote sensing		4	2		0.4				
1021		515093	4025379	unsurveyed	remote sensing		4	3		0.1				
1022		522815	4025541	unsurveyed	remote sensing		4	2		0.2				
1023		527132	4024692	unsurveyed	remote sensing		14	3		0.3				
1026		528446	4024965	unsurveyed	remote sensing		14	2		0.5				single building
1027		523907	4023786	unsurveyed	remote sensing		12	2		1.6				
1028		519948	4022312	unsurveyed	remote sensing		4	2		0.3				
1031		532156	4021186	unsurveyed	remote sensing		15	3		20.8				
1032		536152	4021867	unsurveyed	remote sensing		12	3		1.6				
1033		543155	4021725	unsurveyed	remote sensing		4	2		0.9				
1034		544029	4022012	unsurveyed	remote sensing		8	1		1.1				
1035		557186	4020321	unsurveyed	remote sensing		15	1		2.5				
1036		549861	4020287	unsurveyed	remote sensing		4	3		0.3				
1044		546048	4019779	unsurveyed	remote sensing		4	3		0.1				

Table A.1 (continued)

Site ID	site name	UTM co-ordinates east	UTM co-ordinates north	survey area	source	ground survey's Site ID	site type code	clarity code	two-tiered fortified tell type	area (ha)	broad occupation periods	LC phases	EJZ phases	notes
1045		543253	4020624	unsurveyed	remote sensing		4	3		0.0				
1046		532356	4021250	unsurveyed	remote sensing		4	2		0.2				
1047		522006	4020500	unsurveyed	remote sensing		14	1		0.2				single building
1052		563751	4018700	unsurveyed	remote sensing		4	3		0.1				
1053		508539	4018019	unsurveyed	remote sensing		14	3		0.9				single building
1054		519156	4015388	unsurveyed	remote sensing		17	1	other	3.8				with possible lower town settlement
1055		566367	4015850	unsurveyed	remote sensing		4	3		0.3				
1056		525108	4015076	unsurveyed	remote sensing		15	1		6.2				
1062		522573	4014419	unsurveyed	remote sensing		8	2		0.9				
1063		513300	4014410	unsurveyed	remote sensing		14	1		0.2				single building
1064		520905	4013111	unsurveyed	remote sensing		4	2		0.1				
1065	Tell Jerwa	527016	4013786	unsurveyed	remote sensing		17	1	other	1.6				possible surroudning halo of larger (ca. 650 metre diameter) "lower town"
1066		571113	4013852	unsurveyed	remote sensing		14	3		0.3				single building
1069		559218	4012298	unsurveyed	remote sensing		14	3		0.3				single building
1070		529929	4010363	unsurveyed	remote sensing		14	3		0.3				single building
1071		562542	4009949	unsurveyed	remote sensing		12	2		0.4				
1072		551889	4009184	unsurveyed	remote sensing		14	2		0.5				
1073		525564	4009493	unsurveyed	remote sensing		4	2		0.5				
1074		566721	4006901	unsurveyed	remote sensing		4	2		0.3				
1075		570471	4008008	unsurveyed	remote sensing		18	2		0.3				
1079		567495	4006697	unsurveyed	remote sensing		4	3		0.3				
1080		512808	4005770	unsurveyed	remote sensing		8	2		1.4				
1081		538518	4004927	unsurveyed	remote sensing		4	3		0.1				
1082		538449	4005290	unsurveyed	remote sensing		8	2		0.2				
1083		576138	4004711	unsurveyed	remote sensing		8	2		0.7				
1084		576783	4003487	unsurveyed	remote sensing		14	3		0.2				
1085		574074	4003505	unsurveyed	remote sensing		8	1		0.4				
1086		574140	4003583	unsurveyed	remote sensing		14	2		0.2				single building
1087		521832	4003640	unsurveyed	remote sensing		4	3		0.2				
1089		569784	4001555	unsurveyed	remote sensing		4	3		0.4				
1090		567963	4001693	unsurveyed	remote sensing		4	3		1.0				
1091		537768	3999260	unsurveyed	remote sensing		14	3		0.2				single building
1092		568065	3998561	unsurveyed	remote sensing		4	3		0.4				
1093		575064	3999275	unsurveyed	remote sensing		18	3		0.3				
1094		573531	3997781	unsurveyed	remote sensing		4	2		0.2				
1095		550203	3996983	unsurveyed	remote sensing		4	2		0.1				
1096		537651	3996926	unsurveyed	remote sensing		4	2		0.3				
1097		537486	3997109	unsurveyed	remote sensing		18	2		0.5				
1098		528417	3996374	unsurveyed	remote sensing		4	2		0.2				
1100		540918	3996605	unsurveyed	remote sensing		14	2		0.6				single building
1101		570315	3996242	unsurveyed	remote sensing		4	2		1.1				two small mounds; mainly from ASTER, as unclear on CORONA
1102		572439	3994589	unsurveyed	remote sensing		4	3		0.2				
1103		567282	3994811	unsurveyed	remote sensing		4	2		2.0				
1104		563025	3994253	unsurveyed	remote sensing		14	3		1.1				
1105		558705	3994322	unsurveyed	remote sensing		4	2		0.3				
1106		557934	3994499	unsurveyed	remote sensing		4	2		0.2				
1111		541587	3995105	unsurveyed	remote sensing		2	1		0.2				small

Table A.1 (continued)

Site ID	site name	UTM co-ordinates		survey area	source	ground survey's Site ID	site type code	clarity code	two-tiered fortified tell type	area (ha)	broad occupation periods	LC phases	EJZ phases	notes
		east	north											
1112		541311	3995240	unsurveyed	remote sensing		18	3		0.5				
1114		518256	3993473	unsurveyed	remote sensing		14	1		0.4				single building
1116		565236	3993716	unsurveyed	remote sensing		14	2		0.3				single building
1117		513261	3992072	unsurveyed	remote sensing		4	2		0.1				with possible short hollow ways
1118		563097	3988892	unsurveyed	remote sensing		4	2		0.3				
1119		530508	3988736	unsurveyed	remote sensing		4	3		0.1				
1120		530100	3988502	unsurveyed	remote sensing		14	1		0.4				single building
1121		538254	3986894	unsurveyed	remote sensing		12	2		0.1				
1124		637143	3987149	unsurveyed	remote sensing		12	1		4.3				
1125		523769	3987932	unsurveyed	remote sensing		14	3		0.1				single building
1126		568078	3985568	unsurveyed	remote sensing		14	1		1.2				
1127		568321	3985858	unsurveyed	remote sensing		8	1		0.1				
1128		567766	3986231	unsurveyed	remote sensing		14	1		0.1				single building
1129		565930	3985786	unsurveyed	remote sensing		15	3		5.9				
1130		561779	3986117	unsurveyed	remote sensing		14	3		0.7				
1134		538014	3986300	unsurveyed	remote sensing		4	3		1.3				several very small mounds
1135		520649	3984572	unsurveyed	remote sensing		8	1		1.5				
1136		546395	3985048	unsurveyed	remote sensing		14	3		1.7				
1137		558533	3983783	unsurveyed	remote sensing		14	2		0.1				single building
1138		562955	3984963	unsurveyed	remote sensing		14	3		0.8				
1139		580904	3984442	unsurveyed	remote sensing		14	3		1.2				
1140		613971	3984098	unsurveyed	remote sensing		14	3		1.1				
1141		624948	3984480	unsurveyed	remote sensing		4	2		0.1				
1142		654855	3983199	unsurveyed	remote sensing		14	3		2.2				
1143		647284	3982691	unsurveyed	remote sensing		14	2		0.4				single building
1144		645502	3983786	unsurveyed	remote sensing		4	3		0.2				
1145		645057	3983158	unsurveyed	remote sensing		12	2		1.2				
1146		643433	3982950	unsurveyed	remote sensing		4	3		0.6				
1147		644300	3982622	unsurveyed	remote sensing		4	1		2.5				several very small mounds
1148		642114	3982897	unsurveyed	remote sensing		14	3		2.3				with possible irregular enclosing wall
1149		640408	3983152	unsurveyed	remote sensing		4	1		0.8				several very small mounds
1150		631118	3983313	unsurveyed	remote sensing		4	1		0.6				several very small mounds
1151		625768	3983199	unsurveyed	remote sensing		4	1		0.3				two small mounds
1152		622535	3983691	unsurveyed	remote sensing		14	2		0.2				
1153		612138	3983805	unsurveyed	remote sensing		17	2	other	0.6				mainly from ASTER, as unclear on CORONA
1156		598578	3983089	unsurveyed	remote sensing		4	2		0.7				several very small mounds
1157		589339	3982591	unsurveyed	remote sensing		4	3		2.2				several very small mounds
1158		581718	3983521	unsurveyed	remote sensing		4	3		0.1				
1159		566857	3982868	unsurveyed	remote sensing		12	2		0.3				
1160		567053	3983196	unsurveyed	remote sensing		14	3		0.2				
1161		562930	3982594	unsurveyed	remote sensing		4	2		0.8				several very small mounds
1162		519229	3983083	unsurveyed	remote sensing		14	1		0.1				single building
1163		521750	3981184	unsurveyed	remote sensing		8	2		0.3				
1164		523191	3981256	unsurveyed	remote sensing		4	2		0.5				
1165		542178	3982423	unsurveyed	remote sensing		14	3		0.2				single building
1166		547944	3981846	unsurveyed	remote sensing		14	2		3.1				single building
1168		548701	3982121	unsurveyed	remote sensing		14	1		0.4				single building
1169		565545	3981269	unsurveyed	remote sensing		8	2		0.5				
1170		568580	3980865	unsurveyed	remote sensing		14	3		0.1				single building

Table A.1 (continued)

Site ID	site name	UTM co-ordinates east	UTM co-ordinates north	survey area	source	ground survey's Site ID	site type code	clarity code	two-tiered fortified tell type	area (ha)	broad occupation periods	LC phases	EJZ phases	notes
1171		577939	3981244	unsurveyed	remote sensing		4	2		0.3				
1172		589966	3981657	unsurveyed	remote sensing		12	3		0.3				
1173		643811	3981824	unsurveyed	remote sensing		14	2		0.8				around 5 buildings in a circular arrangement
1174		646483	3981234	unsurveyed	remote sensing		12	2		1.1				
1175		664820	3980685	unsurveyed	remote sensing		14	2		0.1				single building
1176		661637	3979988	unsurveyed	remote sensing		14	2		0.8				single building; with possible square enclosing wall
1177		646467	3980846	unsurveyed	remote sensing		8	1		0.4				
1178		632601	3980588	unsurveyed	remote sensing		4	2		0.1				
1179		624030	3981020	unsurveyed	remote sensing		17	3	other	0.4				
1180		616126	3980086	unsurveyed	remote sensing		14	1		0.3				single building
1187		599332	3979521	unsurveyed	remote sensing		12	1		0.7				
1188		598994	3979723	unsurveyed	remote sensing		4	2		0.2				
1189		579052	3979698	unsurveyed	remote sensing		4	2		0.1				
1190		575182	3979887	unsurveyed	remote sensing		4	2		0.1				
1191		566722	3979692	unsurveyed	remote sensing		12	3		3.9				
1192		551165	3978593	unsurveyed	remote sensing		14	2		0.1				single building
1193		560786	3978698	unsurveyed	remote sensing		4	3		0.2				
1194		560777	3979025	unsurveyed	remote sensing		4	2		0.9				3 small mounds
1195		560777	3979283	unsurveyed	remote sensing		8	1		4.9				
1196		591365	3979028	unsurveyed	remote sensing		14	3		1.2				single building
1197		593861	3978275	unsurveyed	remote sensing		14	2		0.2				single building
1198		644351	3979412	unsurveyed	remote sensing		8	2		0.1				
1199		666326	3977216	unsurveyed	remote sensing		12	1		0.8				
1200		664625	3977429	unsurveyed	remote sensing		12	2		0.6				
1201		640949	3977144	unsurveyed	remote sensing		8	1		0.6				
1202		631754	3977483	unsurveyed	remote sensing		14	3		0.1				single building
1203		625853	3977816	unsurveyed	remote sensing		8	2		0.7				
1204		591272	3976754	unsurveyed	remote sensing		12	1		0.2				
1209		586370	3977684	unsurveyed	remote sensing		14	2		0.1				single building
1210		574844	3976901	unsurveyed	remote sensing		12	1		0.6				
1211		571388	3976625	unsurveyed	remote sensing		18	3		0.5				
1212		567590	3977798	unsurveyed	remote sensing		14	2		3.6				single building
1213		558962	3977801	unsurveyed	remote sensing		4	1		0.1				
1214		566156	3976385	unsurveyed	remote sensing		12	2		0.3				
1215		591383	3975722	unsurveyed	remote sensing		14	1		0.3				single building
1217		596576	3975209	unsurveyed	remote sensing		8	2		0.5				
1218		598637	3975416	unsurveyed	remote sensing		18	2		0.8				
1219		621809	3975995	unsurveyed	remote sensing		14	2		12.9				
1220		638234	3976028	unsurveyed	remote sensing		14	3		4.8				single building
1221		658484	3975659	unsurveyed	remote sensing		18	2		0.4				
1222		660434	3974330	unsurveyed	remote sensing		14	1		0.1				single building
1224		605630	3974441	unsurveyed	remote sensing		4	2		0.3				
1225		586070	3974012	unsurveyed	remote sensing		17	2		0.3				possible very faint circular surrounding wall
1226		580637	3974201	unsurveyed	remote sensing		4	2		0.5				with possible small lower town settlement
1227		558848	3973865	unsurveyed	remote sensing		8	1		23.7				several small features
1228		553871	3974879	unsurveyed	remote sensing		14	2		0.2				single building
1229		556121	3973445	unsurveyed	remote sensing		12	3		4.1				

Table A.1 (continued)

Site ID	site name	UTM co-ordinates east	UTM co-ordinates north	survey area	source	ground survey's Site ID	site type code	clarity code	two-tiered fortified tell type	area (ha)	broad occupation periods	LC phases	EJZ phases	notes
1230		559049	3972428	unsurveyed	remote sensing		3	3	true Kranzhügel	4.3				very tentative
1231		566162	3972749	unsurveyed	remote sensing		8	2		1.3				
1233		572303	3973271	unsurveyed	remote sensing		8	1		2.4				
1234		575288	3973025	unsurveyed	remote sensing		14	1		0.3				single building
1235		567818	3972086	unsurveyed	remote sensing		12	2		0.2				
1236		559439	3970625	unsurveyed	remote sensing		12	2		0.1				
1237		577580	3969554	unsurveyed	remote sensing		2	3		1.1				
1238		597911	3968876	unsurveyed	remote sensing		14	3		0.2				single building
1239		580841	3968666	unsurveyed	remote sensing		15	2		23.2				
1240		575393	3968345	unsurveyed	remote sensing		8	2		2.9				
1241		575939	3968759	unsurveyed	remote sensing		12	3		5.2				
1242		536351	3967829	unsurveyed	remote sensing		12	1		0.2				
1243		656870	3967022	unsurveyed	remote sensing		14	1		0.3				single building
1244		657644	3966229	unsurveyed	remote sensing		4	3		0.2				
1245		658274	3967169	unsurveyed	remote sensing		12	2		0.5				
1246		637049	3966233	unsurveyed	remote sensing		14	2		0.2				single building
1247		594305	3965600	unsurveyed	remote sensing		14	3		0.2				single building
1248		563906	3966119	unsurveyed	remote sensing		8	2		0.1				
1249		559895	3965171	unsurveyed	remote sensing		14	3		0.4				single building
1251		554201	3965756	unsurveyed	remote sensing		12	2		0.1				
1252		540302	3966098	unsurveyed	remote sensing		14	2		0.1				single building
1253		585691	3964449	unsurveyed	remote sensing		8	1		4.0				several small rectangular features
1254		651718	3963778	unsurveyed	remote sensing		2	3		1.0				
1255		657702	3964699	unsurveyed	remote sensing		14	2		0.1				single building
1256		640167	3963235	unsurveyed	remote sensing		12	2		0.1				
1257		629477	3962342	unsurveyed	remote sensing		15	3		2.8				
1259		573827	3962759	unsurveyed	remote sensing		8	1		0.3				several small circular structures; on Euphrates embankment
1260		575881	3961254	unsurveyed	remote sensing		8	2		0.7				several small circular structures; on Euphrates embankment
1261		593835	3961853	unsurveyed	remote sensing		14	2		0.8				3 small square features
1262		598195	3962027	unsurveyed	remote sensing		4	3		0.6				
1263		577439	3960150	unsurveyed	remote sensing		8	2		0.6				several small circular structures
1264		639722	3957690	unsurveyed	remote sensing		8	2		0.5				several small circular structures
1267		656084	3958049	unsurveyed	remote sensing		8	1		0.2				
1268		643752	3957179	unsurveyed	remote sensing		12	2		0.1				
1269		585967	3957346	unsurveyed	remote sensing		14	3		0.4				
1270		581986	3955760	unsurveyed	remote sensing		17	3	ringwall settlement	2.5				with possible faint concentric wall and/or lower town
1271		593265	3953501	unsurveyed	remote sensing		4	3		0.2				
1272		590951	3952298	unsurveyed	remote sensing		14	2		0.3				
1275		594471	3952779	unsurveyed	remote sensing		8	1		3.0				circular structures
1276		628275	3950740	unsurveyed	remote sensing		14	3		0.2				single building
1277		596255	3951723	unsurveyed	remote sensing		12	2		0.2				
1278		597730	3949973	unsurveyed	remote sensing		14	2		0.1				single building
1279		623914	3950209	unsurveyed	remote sensing		8	2		0.7				
1282		644036	3950115	unsurveyed	remote sensing		8	1		0.9				circular structures
1283		607481	3948778	unsurveyed	remote sensing		14	2		0.3				

Table A.1 (continued)

Site ID	site name	UTM co-ordinates east	UTM co-ordinates north	survey area	source	ground survey's Site ID	site type code	clarity code	two-tiered fortified tell type	area (ha)	broad occupation periods	LC phases	EJZ phases	notes
1286		591910	3948142	unsurveyed	remote sensing		14	3		0.2				
1287		595166	3946573	unsurveyed	remote sensing		14	3		0.3				
1288		589265	3944358	unsurveyed	remote sensing		14	2		0.1				
1289		624936	3942830	unsurveyed	remote sensing		14	2		0.2				
1290		623619	3942261	unsurveyed	remote sensing		4	2		5.6				several very small mounds
1291		590315	3941675	unsurveyed	remote sensing		12	3		0.7				
1292		627284	3939141	unsurveyed	remote sensing		12	2		0.1				
1294		622555	3939824	unsurveyed	remote sensing		12	1		0.2				
1296		638254	3938549	unsurveyed	remote sensing		12	3		0.1				
1297		640935	3937796	unsurveyed	remote sensing		4	3		0.0				
1298		614871	3935307	unsurveyed	remote sensing		12	2		0.1				
1301		627531	3930818	unsurveyed	remote sensing		8	2		0.4				several very small features
1302		602711	3928781	unsurveyed	remote sensing		8	3		0.2				
1303		619902	3928595	unsurveyed	remote sensing		12	2		0.4				
1304		633984	3922670	unsurveyed	remote sensing		12	1		0.4				
1307		611115	3922375	unsurveyed	remote sensing		14	2		0.1				single building
1308		618757	3919747	unsurveyed	remote sensing		8	2		2.3				
1311		621721	3920477	unsurveyed	remote sensing		12	1		0.2				
1312		627762	3914147	unsurveyed	remote sensing		12	3		0.1				
1316		618193	3913560	unsurveyed	remote sensing		4	2		1.0				
1317		623906	3908425	unsurveyed	remote sensing		11	2	ringwall settlement	2.8				
1318		626375	3907508	unsurveyed	remote sensing		15	2		10.4				
1319		569057	4058445	unsurveyed	remote sensing		14	2		6.9				
1320	Tell Oghlan	509398	4061074	unsurveyed	remote sensing		17	1	other	9.2				toponym from "Karte von Kleinasien"
1322	Tell Maraza lower town	520199	4055416	Yale Khabur	remote sensing		13	2		17.7				mentioned by Kühne 1978-79
1323		657357	3965021	Yale Khabur	remote sensing		14	1		0.4				single building
1324		570350	3992515	Westjazira/ Sweyhat	ground survey	13	4	0		5.4				
1325		651700	4013036	Westjazira/ Sweyhat	ground survey	15b	4	0		3.7				
1326	Bir Mjeibna	607809	4007116	Westjazira/ Sweyhat	ground survey	15c	4	0		5.1				
1327	Mjeibna	463450	3996283	Westjazira/ Sweyhat	ground survey	16	4	0		4.8				
1328	Khirbet Taha	453310	4008948	Westjazira/ Sweyhat	ground survey	17	4	0		2.3	EBA			
1329	Joub al-Shayir	451686	4006466	Westjazira/ Sweyhat	ground survey	22	4	0		10.8	EBA			
1330	Tell Shayir	450510	4003312	Westjazira/ Sweyhat	ground survey	23	4	0		0.2	EBA			
1331	Wadi Khaznah	621329	4038061	Yale Khabur	ground survey	160	9	0		unknown	LC	1, 2, 3		
1332	Bir Mu'azzar	618406	4016529	Yale Khabur	ground survey	211	9	0		2.0	LC	1, 2, 3		
1333	Mjeddi	557686	4043170	Wadi Hamar	ground survey	8	9	0		1.0	EBA		0, 1	

Table A.1 (continued)

Bibliography

Abbreviations:

AAAS – Les Annales Archéologiques Arabes Syriennes (prior to 1966: Les Annales Archéologiques de Syrie)
AfO – Archiv für Orientforschung
AoF – Altorientalische Forschungen
BASOR – Bulletin of the American Schools of Oriental Research
MDOG – Mitteilungen der Deutschen Orient-Gesellschaft zu Berlin

Abrams, M. 2000. The Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER): Data products for the high spatial resolution imager on NASA's Terra platform, *International Journal of Remote Sensing* 21(5): 847-861.

Adams, R. McC. 1978. Strategies of Maximization, Stability, and Resilience in Mesopotamian Society, Settlement, and Agriculture, *Proceedings of the American Philosophical Society* 122(5): 329-335.

Akkermans, P. M. M. G. 1988. The Period V Pottery. In M. N. van Loon (ed.) *Hammam et-Turkman I, Vol. I*: 287-349. Istanbul. Nederlands Historisch-Archeologisch Instituut.

Akkermans, P. M. M. G. and G. M. Schwartz. 2003. *The Archaeology of Syria. From Complex Hunter-Gatherers to Early Urban Societies (ca. 16,000-300 BC)*. Cambridge. Cambridge University Press.

Algaze, G. 1993. *The Uruk World System. The Dynamics of Expansion of Early Mesopotamian Civilization*. Chicago, IL. University of Chicago Press.

Algaze, G. 1999. Trends in the Archaeological Development of the Upper Euphrates Basin of Southeastern Anatolia During the Late Chalcolithic and Early Bronze Ages. In G. del Olmo Lete and J.-L. Montero Fenollos (eds.) *Archaeology of the Upper Syrian Euphrates: The Tishrin Dam Area*: 535-572. Barcelona. Editorial Ausa.

Algaze, G. 2007. The Sumerian Takeoff. In E. C. Stone (ed.) *Settlement and Society. Essays Dedicated to Robert McCormick Adams* (Cotsen Institute of Archaeology Ideas, Debates and Perspectives 3): 343-368. Los Angeles, CA. Cotsen Institute of Archaeology.

Algaze, G. 2008. *Ancient Mesopotamia at the Dawn of Civilization. The Evolution of an Urban Landscape*. Chicago, IL. University of Chicago Press.

Altaweel, M. 2005. The Use of ASTER Satellite Imagery in Archaeological Contexts, *Archaeological Prospection* 12: 151-166.

Anthony, D. W. 1990. Migration in Archeology: The Baby and the Bathwater, *American Anthropologist* 92(4): 895-914.

Arbuckle, B. S. 2012. Animals in the Ancient World. In D. T. Potts (ed.) *A Companion to the Archaeology of the Ancient Near East, Vol. 1*: 201-219. Chichester. Wiley-Blackwell.

Archi, A. 1989. La ville d'Abarsal. In M. Lebeau and P. Talon (eds.) *Reflets des deux fleuves. Volumes de mélanges offerts à A. Finet* (Akkadica Supplementum 6): 15-19. Leuven. Peeters Press.

Archi, A. 1993. Trade and Administrative Practice: The Case of Ebla, *AoF* 20(1): 43-58.

Archi, A. 2014. La situation géopolitique de la Syrie avant l'expansion d'Akkad, *Syria* Supplément II "Mari, ni Est, ni Ouest": 161-171.

Archi, A. and M. G. Biga. 2003. A Victory over Mari and the Fall of Ebla, *Journal of Cuneiform Studies* 55: 1-44.

Astour, M. C. 1992. An Outline of the History of Ebla (Part 1). In C. H. Gordon and G. A. Rendsburg (eds.) *Eblaitica: Essays on the Ebla Archives and Eblaite Language, Vol. 3*: 3-82. Winona Lake, IN. Eisenbrauns.

Baghdo, A. el-M. H., L. Martin, M. Novák, and W. Orthmann (eds.) 2009. *Tell Halaf: Vorberichte über die erste und zweite syrisch-deutsche Grabungskampagne* (VFMOS 3). Wiesbaden. Harrassowitz Verlag.

Bakewell, O., H. de Haas, and A. Kubal. 2011. Migration Systems, Pioneers and the Role of Agency, *International Migration Institute Working Paper* 48.

Bar-Matthews, M. and A. Ayalon. 2011. Mid-Holocene climate variations revealed by high-resolution speleothem records from Soreq Cave, Israel and their correlation with cultural changes, *The Holocene* 21(1): 163-171.

Bar-Oz, G., M. Zeder, and F. Hole. 2011. Role of mass-kill hunting strategies in the extirpation of Persian gazelle (*Gazella subgutturosa*) in the northern Levant, *Proceedings of the National Academy of Sciences* 108(18): 7345-7350.

Barge, O., C. Castel, and J. É. Brochier. 2014. Human impact on the landscape around Al-Rawda (Syria) during the Early Bronze IV. In D. Morandi Bonacossi (ed.) *Settlement Dynamics and Human-Landscape Interaction in the Dry Steppes of Syria* (Studia Chaburensia 4): 173-185. Wiesbaden. Harrassowitz Verlag.

Barjamovic, G. 2008. The geography of trade. Assyrian colonies in Anatolia c. 1975-1725 BC and the study of early interregional networks of exchange. In J. G. Dercksen (ed.) *Anatolia and the Jazira during the Old Assyrian period* (OAAS 3): 87-100. Leiden. Nederlands Instituut voor het Nabije Oosten.

Batiuk, S. D. 2013. The fruits of migration: Understanding the 'longue dureé' and the socio-economic relations of the Early Transcaucasian Culture, *Journal of Anthropological Archaeology* 32(4): 449-477.

Bauzou, T. 2000. Les recherché archéologiques d'Antoine Poidebard en Syrie, de 1925 à 1932. In L. Nordiguian and J.-F. Salles (eds.) *Aux origines de l'archéologie aérienne: A. Poidebard (1878-1955)*: 59-78. Beirut. Presses de l'Université Saint-Joseph.

Beck, A., G. Philip, M. Abdulkarim, and D. Donoghue. 2007. Evaluation of Corona and Ikonos high resolution satellite imagery for archaeological prospection in western Syria, *Antiquity* 81(311): 161-175.

Becker, J. 2004. Halaf- und 'Obed-Zeit im Wadi al-Hamar, Nordost-Syrien. In M. Mode (ed.) *Morgenländische Altertümer: Studien aus dem Institut für Orientalische Archäologie und Kunst* (HBO 37): 97-133. Halle (Saale). Institut für Orientalische Archäologie und Kunst der Martin-Luther-Universität.

Becker, J., T. Helms, M. Posselt, and E. Vila. 2007. Ausgrabungen in Tell Tawila, Nordost-Syrien, *MDOG* 139: 213-268.

Bell, G. 1911. *Amurath to Amurath*. London. William Heinemann.

Bernbeck, R. 1997. *Theorien in der Archäologie*. Tübingen. A. Francke Verlag.

Betts, A. V. G. (ed.) 1991. *Excavations at Jawa 1972-1986*. Edinburgh. Edinburgh University Press.

Bewley, R. 2005. Aerial Archaeology. The First Century. In J. Bourgeois and M. Meganck (eds.) *Aerial Photography and Archaeology 2003: A Century of Information* (ARGU 4): 15-30. Gent. Academia Press.

Bradbury, J. and G. Philip. 2011. The world beyond Tells: pre-classical activity in the basalt landscape of the Homs region, Syria. In T. Steimer-Herbet (ed.) *Pierres levées, stèles anthropomorphes et dolmens* / *Standing stones, anthropomorphic stelae and dolmens* (BAR International Series 2317): 169-180. Oxford. Archaeopress.

Bradbury, J., F. Braemer, and M. Sala. 2014. Fitting upland, steppe, and desert into a 'big picture' perspective: a case study from northern Jordan, *Levant* 46(2): 206-229.

Braemer, F., D. Genequand, C. D. Maridat, P.-M. Blanc, J.-M. Dentzer, D. Gazagne and P. Wech. 2009. Long-term management of water in the Central Levant: the Hawran case (Syria), *World Archaeology* 41(1): 36-57.

Bretschneider, J. 1997. Untersuchungen an der äußeren Wallanlage (Feld H). In M. Lebeau and A. Suleiman (eds.) *Tell Beydar, Three Seasons of Excavations (1992-1994): A Preliminary Report* (Subartu 3): 193-208. Turnhout. Brepols.

Bretschneider, J. 2005. Life and Death in Nabada, *Scientific American* special issue 15(1): 52-59.

Butterlin, P. 2003. *Les Temps proto-urbains de Mésopotamie. Contacts et acculturation à l'époque d'Uruk au Moyen-Orient*. Paris. CNRS Éditions.

Butterlin, P. 2010. Cinq campagnes à Mari : nouvelles perspectives sur l'histoire de la métropole du Moyen Euphrate, *Comptes rendus des séances de l'Académie des Inscriptions et Belles-Lettres* 2010(1) : 171-229.

Butterlin, P. 2013. Limites urbaines et enceintes fortifiées Éléments de topologie urbaine au Proche Orient ancien au III^{e} millénaire avant notre ère, *Cahier des Thèmes transversaux ArScAn* 11, Thème 8: 257-263.

Butterlin, P. in press. Mari: Morphogenesis and Evolution of a Round City. In P. Quenet, C. Castel, and J.-W. Meyer (eds.)

Campbell, S. 2007. Rethinking Halaf Chronologies, *Paléorient* 33(1): 103-136.

Casana, J. 2013. Radial route systems and agro-pastoral strategies in the Fertile Crescent: New discoveries from western Syria and southwestern Iran, *Journal of Anthropological Archaeology* 32: 257-273.

Casana, J. 2014. Regional-Scale Archaeological Remote Sensing in the Age of Big Data, *Advances in Archaeological Practice* 2(3): 222-233.

Casana, J. and J. T. Herrmann. 2010. Settlement History and Urban Planning at Zincirli Höyük, Southern Turkey, *Journal of Mediterranean Archaeology* 23(1): 55-80.

Casana, J., J. Cothren, and T. Kalayci. 2012. Swords into Ploughshares: Archaeological Applications of CORONA Satellite Imagery in the Near East, *Internet Archaeology* 32(2).

Castel, C. 2010. The First Temples *in antis*: The Sanctuary of Tell Al-Rawda in the Context of 3rd Millennium Syria. In J. Becker, R. Hempelmann, and E. Rehm (eds.) *Kulturlandschaft Syrien. Zentrum und Peripherie. Festschrift für Jan-Waalke Meyer* (AOAT 371): 123-164. Münster. Ugarit-Verlag.

Castel, C. and E. Peltenburg. 2007. Urbanism on the margins: third millennium BC Al-Rawda in the arid zone of Syria, *Antiquity* 81(313): 601-616.

Castel, C., D. Archambault, N. Awad, O. Barge, T. Boudier, J. Brochier, A. Cuny, S. Gondet, L. Herveux, F. Isnard, L. Martin, P. Quenet, S. Sanz, and E. Vila. 2008. Rapport préliminaire sur les activités de la mission archéologique franco-syrienne dans la micro-région d'Al-Rawda (Shamiyeh): quatrième et cinquième campagnes (2005 et 2006), *Akkadica* 129(1): 5-54.

Cauvin, J. 1970. Mission 1969 en Djezireh (Syrie), *Bulletin de la Société préhistorique française, Comptes rendus des séances mensuelles* 67(9): 286-287.

Cauvin, J. 1978. *Les premiers villages de Syrie - Palestine du IXème au VIIème millénaire avant J. C.* (CMO 4, Arch. 3). Lyon. Maison de l'Orient méditerranéen ancien.

Chamberlain, A. T. 2006. *Demography in Archaeology*. Cambridge. Cambridge University Press.

Chisholm, M. 1962. *Rural Settlement and Land Use. An Essay in Location*. London. Hutchinson & Co.

Córdoba, J. M. 1988. Prospección en el valle de río Balih (Siria). Informe provisional, *Aula Orientalis* 6(2): 149-188.

Courty, M.-A. 1994. Le Cadre paléogéographique des occupations humaines dans le bassin du Haut-Khabur (Syrie du Nord-Est). Premiers résultats, *Paléorient* 20(1): 21-59.

Courty, M.-A. 2001. Evidence at Tell Brak for the Late EDIII/Early Akkadian air blast event (4 kyr BP). In D. Oates, J. Oates, and H. McDonald (eds.) *Excavations at Tell Brak. Vol. 2: Nagar in the third millennium BC*: 367-372. Cambridge. McDonald Institute for Archaeological Research.

Creekmore, A. T. 2008. *Kazane Höyük and Urban Life Histories in Third Millennium Upper Mesopotamia*, Ph.D. dissertation. Evanston, IL. Northwestern University, Department of Anthropology.

Creekmore, A. T. 2014. The Social Production of Space in Third-Millennium Cities of Upper Mesopotamia. In A. T. Creekmore and K. D. Fisher (eds.) *Making Ancient Cities: Space and Place in Early Urban Societies*: 32-73. Cambridge. Cambridge University Press.

Cribb, R. 1991. *Nomads in Archaeology*. Cambridge. Cambridge University Press.

Cullen, H., P. deMenocal, S. Hemming, G. Hemming, F. Brown, T. Guilderson, and F. Sirocko. 2000. Climate change and the collapse of the Akkadian empire: Evidence from the deep sea, *Geology* 28(4): 379-382.

Cunliffe, E. 2012. *Damage to the Soul: Syria's Cultural Heritage in Conflict*. Palo Alto, CA. Global Heritage Fund.

Cunliffe, E. 2013. *Satellites and Site Destruction: An Analysis of Modern Impacts on the Archaeological Resource of the Ancient Near East*, Ph.D. dissertation. Durham. Durham University, Department of Archaeology.

Curvers, H. H. 1991. *Bronze Age Society in the Balikh Drainage (Syria)*, Ph.D. dissertation. Amsterdam. Universiteit van Amsterdam, Faculteit der Letteren.

Danti, M. 2000. *Early Bronze Age Settlement and Land Use in the Tell es-Sweyhat Region, Syria*, Ph.D. dissertation. Philadelphia, PA. University of Pennsylvania, Department of Anthropology.

de Jong, L. 2012. Resettling the steppe: The archaeology of the Balikh Valley in the Early Islamic Period. In R. Matthews and J. Curtis (eds.) *Proceedings of the 7th International Congress on the Archaeology of the Ancient Near East, Vol. 2*: 517-531. Wiesbaden. Harrassowitz Verlag.

Deckers, K. and H. Pessin. 2011. Vegetation development in relation to human occupation and climatic change in the Middle Euphrates and Upper Jazirah (Syria/Turkey) during the Bronze Age. In K. Deckers (ed.) *Holocene Landscapes Through Time in the Fertile Crescent* (Subartu 28): 33-48. Turnhout. Brepols.

Deckers, K. and S. Riehl. 2007. Fluvial environmental contexts for archaeological sites in the Upper Khabur basin (northeastern Syria), *Quaternary Research* 67(3): 337-348.

Dercksen, J. G. 1996. *The old Assyrian copper trade in Anatolia*. Istanbul. Nederlands Historisch-Archeologisch Instituut.

Dercksen, J. G. and V. Donbaz. 2001. Merchants in Distress. An Old Assyrian Text mentioning habbatu, *Jaarbericht van het Vooraziatisch-Egyptisch Genootschap "Ex Oriente Lux"* 35-36: 103-110.

Dittmann, R. 1990. Ausgrabungen der Freien Universität Berlin in Assur und Kar-Tukulti-Ninurta in den Jahren 1986-89, *MDOG* 122: 157-171.

Dohmann-Pfälzner, H. and P. Pfälzner. 2001. Ausgrabungen der Deutschen Orient-Gesellschaft in der zentralen Oberstadt von Tall Mozan-Urkes, *MDOG* 133: 97-139.

Dohmann-Pfälzner, H. and P. Pfälzner. 2002. Untersuchungen zur Urbanisierung Nordmesopotamiens im 3. Jt. v. Chr. am Beispiel des Tall Chuera, Syrien. In Ricardo Eichmann (ed.) *Ausgrabungen und Surveys im Vorderen Orient I* (OrA 5): 1-22. Rahden. Verlag Marie Leidorf.

Donoghue, D., N. Galiatsatos, G. Philip, A. Beck. 2002. Satellite imagery for archaeological applications: a case study from the Orontes Valley, Syria. In R. H. Bewley and W. Raczkowski (eds.) *Aerial Archaeology. Developing Future Practice* (NATO Science Series I, 337): 211-223. Amsterdam. IOS Press.

Einwag, B. 1993. Vorbericht über die archäologische Geländebegehung in der Westgazira, *Damaszener Mitteilungen* 7: 23-43.

Einwag, B. 1993-1994. Der Survey in der Westgazira, *AfO* 40-41: 299-301.

Einwag, B. 2000. Die West-Gazira in der Eisenzeit. In Guy Bunnens (ed.) *Essays on Syria in the Iron Age*: 307-325. Leuven. Peeters Press.

Ergenzinger, P. 1991. Geomorphologische Untersuchungen im Unterlauf des Habur. In H. Kühne (ed.) *Die rezente Umwelt von Tall Seh Hamad und Daten zur Umweltrekonstruktion der Assyrischen Stadt Dur-Katlimmu*: 35-50. Berlin. Dietrich Reimer Verlag.

Falb, C. 2009. *Untersuchungen an Keramikwaren des dritten Jahrtausands v.Chr. aus Nordsyrien*. Münster. Ugarit-Verlag.

Falb, C. 2010. Grabungen im Bereich H West. In J.-W. Meyer (ed.): 83-172.

Fales, F. M. 2010. Production and Consumption at Dur-Katlimmu: A Survey of the Evidence. In H. Kühne (ed.) *Dur-Katlimmu 2008 and Beyond* (Studia Chaburensia 1): 67-85. Wiesbaden. Harrassowitz Verlag.

Fielden, K. 1977. Tell Brak 1976: The Pottery, *Iraq* 39(2): 245-255.

Finkbeiner, U., M. Novak, F. Sakal, and P. Sconzo (eds.) 2015. *Middle Euphrates* (ARCANE vol. IV). Turnhout. Brepols.

Finkelstein, I. 1992. Invisible Nomads: A Rejoinder, *BASOR* 287: 87-88.

Finkelstein, I. and D. Langgut. 2014. Dry Climate in the Middle Bronze I and Its Impact on Settlement Patterns in the Levant and Beyond: New Pollen Evidence, *Journal of Near Eastern Studies* 73(2): 219-234.

Frangipane, M. 2002. 'Non-Uruk' Developments and Uruk-Linked Features on the Northern Borders of Greater Mesopotamia. In J. N. Postgate (ed.) *Artefacts of Complexity: Tracking the Uruk in the Near East* (Iraq Archaeological Reports 5): 123-148. Warminster. British School of Archaeology in Iraq.

Frangipane, M. 2009. Rise and Collapse of the Late Uruk Centres in Upper Mesopotamia and Eastern Anatolia, *Scienze dell'Antichità* 15: 25-41.

Fritzsch, D. 2011. *Mikromorphologische und archäopedologische Untersuchungen von Böden und Sedimenten der bronzezeitlichen Siedlung Tell Chuera, Nord-Syrien*, Ph.D. dissertation. Frankfurt. Johann Wolfgang Goethe-Universität, Fachbereich 11 Geowissenschaften/Geographie.

Fujii, S. and T. Adachi. 2010. Archaeological Investigations of Bronze Age Cairn Fields on the Northwestern Flank of Mt. Bishri, *al-Rafidan Journal of Western Asiatic Studies* special issue "Formation of Tribal Communities": 61-77.

Galiatsatos, N., T. J. Wilkinson, D. Donoghue, and G. Philip. 2009. The Fragile Crescent Project (FCP): Analysis of Settlement Landscapes using Satellite Imagery. Paper presented at CAA 2009: "Making history interactive", Williamsburg, VA, 22-26 March.

Gavagnin, K. and J. Mas. 2014. Early Jezirah 3b Pottery from Tell Beydar. Selected Inventories from the Latest Seasons of Excavation. In P. Bieliński, M. Gawlikowski, R. Koliński, D. Ławecka, A. Sołtysiak, and Z. Wygnańska (eds.) *Proceedings of the 8th International Congress on the Archaeology of the Ancient Near East, Vol. 2*: 49-71. Wiesbaden. Harrassowitz Verlag.

Gernez, G. 2012. Exceptional Metal Hoards Discovered at Tell Mabtouh (Syria). Paper presented at the 8th International Congress on the Archaeology of the Ancient Near East, Warsaw, 30 April - 4 May.

Gernez, G. and A. Souleiman. 2013. Une exceptionnelle découverte à Tell Mabtouh Sharqi: les dépôts d'armes et objets en métal du temple N. Étude préliminaire. In M. al-Maqdissi, D. Parayre, M. Griesheimer, and É. Ishaq (eds.) *Un cœur syrien. Mélanges dédiés à la mémoire d'Antoine Souleiman* (Studia Orontica 11): 41-59. Damascus. Direction Générale des Antiquités et des Musées de Syrie.

Geyer, B., N. Awad, M. al-Dbiyat, Y. Calvet, and M.-O. Rousset. 2010. Un "Très Long Mur" dans la steppe syrienne, *Paléorient* 36(2): 57-72.

Geyer, B., M. al-Dbiyat, N. Awad, O. Barge, J. Besançon, Y. Calvet, and R. Jaubert. 2007. The Arid Margins of Northern Syria: Occupation of the Land and Modes of Exploitation in the Bronze Age. In D. Morandi Bonacossi (ed.) *Urban and Natural Landscapes of an Ancient Syrian Capital* (Studi Archeologici su Qatna 1; Documents d'Archéologie Syrienne XII): 269-281. Udine. Forum.

Goetze, A. 1953. An Old Babylonian Itinerary, *Journal of Cuneiform Studies* 7(2): 51-72.

Goetze, A. 1964. Remarks on the Old Babylonian Itinerary, *Journal of Cuneiform Studies* 18(4): 114-119.

Gremmen, W. H. E. and S. Bottema. 1991. Palynological Investigations in the Syrian Gazira. In H. Kühne (ed.) *Die rezente Umwelt von Tall Seh Hamad und Daten zur Umweltrekonstruktion der assyrischen Stadt Dur Katlimmu* (BATSH 1): 105-116. Berlin. Dietrich Reimer Verlag.

Haase, C.-P. 1996. Madinat al-Far: The regional late antique traditional of an early Islamic foundation. In K. Bartl and S. R. Hauser (eds.) *Continuity and Change in Northern Mesopotamia from the Hellenistic to the Early Islamic Period* (Berliner Beiträge zum Vorderen Orient 17): 7-20. Berlin. Dietrich Reimer Verlag.

Helms, S. W. 1991. Introduction. In A. V. G. Betts (ed.): 6-18.

Helms, T. and A. Tamm. 2014. Exploring the Outer City of a Major EBA Centre. In P. Bieliński, M. Gawlikowski, R. Koliński, D. Ławecka, A. Sołtysiak, and Z. Wygnańska (eds.) *Proceedings of the 8th International Congress on the Archaeology of the Ancient Near East, Vol. 1*: 287-301. Wiesbaden. Harrassowitz Verlag.

Hempelmann, R. 2005. *Ausgrabungen in Halawa 3. Die bronzezeitliche Keramik von Tell Halawa A.* Saarbrücken. Saarbrücker Druckerei und Velag.

Hempelmann, R. 2010a. Religion und Gesellschaft in Tell Chuera während der Frühbronzezeit. In J. Becker, R. Hempelmann, and E. Rehm (eds.) *Kulturlandschaft Syrien. Zentrum und Peripherie. Festschrift für Jan-Waalke Meyer* (AOAT 371): 227-259. Münster. Ugarit-Verlag.

Hempelmann, R. 2010b. Die Ausgrabungen im Bereich K. In J.-W. Meyer (ed.): 35-81.

Hempelmann, R. 2013. *Tell Chuera, Kharab Sayyar und die Urbanisierung der westlichen Gazira* (VFMOS 2, IV). Wiesbaden. Harrassowitz Verlag.

Hole, F. 1993-1994. The Habur Basin Project, *AfO* 40-41: 289-298.

Hole, F. 1994. Khabur Basin PPN and Early PN Industries. In H. G. Gebel and S. K. Kozlowski (eds.) *Neolithic Chipped Stone Industries of the Fertile Crescent* (SENEPSE 1): 331-347. Berlin. Ex Oriente.

Hole, F. 1996. Intermittent Settlement in the Jebel Abd al-Aziz Region. Paper presented at the international colloquium "The Syrian Djezireh: Cultural Heritage and Interrelations", Der ez-Zor, 22-25 April.

Hole, F. 1997. Evidence for Mid-Holocene Environmental Change in the Western Khabur Drainage, Northeastern Syria. In H. N. Dalfes, G. Kukla, and H. Weiss (eds.) *Third Millennium BC Climate Change and Old World Collapse* (NATO ASI Series I, 49): 39-66. Berlin. Springer Verlag.

Hole, F. 2002-03. Khabur Basin Project – 1986-2001, *AAAS* 45-46: 11-20.

Hole, F. and N. Kouchoukos. 1995. Preliminary Report on an Archaeological Survey in the Western Khabur Basin, 1994. In F. Hole (ed.) *Papers of the Yale University Khabur Basin Project 1986-1997*. New Haven, CT. Yale University, Department of Anthropology.

Hole, F. and N. Kouchoukos. 1996a. Preliminary Report on an Archaeological Survey in the Western Khabur Basin, 1995. In F. Hole (ed.) *Papers of the Yale University Khabur Basin Project 1986-1997*. New Haven, CT. Yale University, Department of Anthropology.

Hole, F. and N. Kouchoukos. 1996b. Supplemental Report on the Yale Jazirah Survey 1994-1995. In F. Hole (ed.) *Papers of the Yale University Khabur Basin Project 1986-1997*. New Haven, CT. Yale University, Department of Anthropology.

Hours, F., O. Aurenche, J. Cauvin, M.-C. Cauvin, L. Copeland, and P. Sanlaville. 1994. *Atlas des Sites du Proche Orient (14000-5700 BP), Vol. I.* Paris. Diffusion de Boccard.

Hritz, C. and T. J. Wilkinson. 2006. Using Shuttle Radar Topography to map ancient water channels in Mesopotamia, *Antiquity* 80(308): 415-424.

Jakob, S. 2009. *Die mittelassyrischen Texte aus Tell Chuera in Nordost-Syrien* (VFMOS 2, III). Wiesbaden. Harrassowitz Verlag.

Johnson, G. A. 1980. Rank-Size Convexity and System Integration: A View from Archaeology, *Economic Geography* 56(3): 234-247.

Kagan, E. J., D. Langgut, E. Boaretto, F. H. Neumann, and M. Stein. 2015. Dead Sea Levels During the Bronze and Iron Ages, *Radiocarbon* 57(2): 237-252.

Kalayci, T. 2013. *Agricultural Production and Stability of Settlement Systems in Upper Mesopotamia during the Early Bronze Age (Third Millennium BCE)*, Ph.D. dissertation. Fayetteville, AR. University of Arkansas, Department of Anthropology.

Kennedy, D. 2011. The "Works of the Old Men" in Arabia: remote sensing in interior Arabia, *Journal of Archaeological Science* 38(12): 3185-3203.

Kibaroğlu, M., C. Falb, and M. Satır. 2008. On the Origin of the Northmesopotamian Metallic Ware: A New View from Sediment Geochemistry, *Der Anschnitt* Beiheft 21 “Anatolian Metal IV”: 211-223.

Kiepert, R. 1910-1915a. Haleb. *Karte von Kleinasien, zweite Auflage*, Blatt D V, 1:400,000. Berlin. Dietrich Reimer Verlag.

Kiepert, R. 1910-1915b. Nsebin. *Karte von Kleinasien, zweite Auflage*, Blatt D VI, 1:400,000. Berlin. Dietrich Reimer Verlag.

Kouchoukos, N. 1998. *Landscape and Social Change in Late Prehistoric Mesopotamia*, Ph.D. dissertation. New Haven, CT. Yale University, Department of Anthropology.

Kouchoukos, N. 2001. Satellite Images and Near Eastern Landscapes, *Near Eastern Archaeology* 64(1-2): 80-91.

Krätschell, A.-M. 2011. *Untersuchungen zur holozänen Landschaftsentwicklung im Umfeld der bronzezeitlichen Siedlung Tell Chuera, Nord-Syrien*, Ph.D. dissertation. Frankfurt. Johann Wolfgang Goethe-Universität, Fachbereich 11 Geowissenschaften/Geographie.

Krebernik, M. and E. Strommenger. 1998. 1980-1995: Tuttul (Tall Bi’a). Ausgrabungen in der Stadt des Gottes Dagan. In G. Wilhelm (ed.) *Zwischen Tigris und Nil. 100 Jahre Ausgrabungen der Deutschen Orient-Gesellschaft in Vorderasien und Ägypten*: 126-137. Mainz. Verlag Philipp von Zabern.

Kudlek, V. 2006. *Ein Beitrag zur Siedlungsgeschichte im Bereich von Tell Chuera,* M.A. dissertation. Frankfurt. Johann Wolfgang Goethe-Universität, Institut für Archäologie und Kulturgeschichte des Vorderen Orients.

Kühne, H. 1974-1977. Zur historischen Geographie am Unteren Habur: Vorläufiger Bericht über eine archäologische Geländebegehung, *AfO* 25: 249-255.

Kühne, H. 1978-1979. Zur historischen Geographie am Unteren Habur: Zweiter, vorläufiger Bericht über eine archäologische Geländebegehung, *AfO* 26: 181-195.

Kühne, H. 1976. *Die Keramik vom Tell Chuera und ihre Beziehungen zu Funden aus Syrien-Palästina, der Türkei und dem Iraq*. Berlin. Gebrüder Mann Verlag.

Kühne, H. 1983. Tall Malhat ed-Deru: Eine Station auf dem Wege nach Kappadokien? In R. M. Boehmer and H. Hauptmann (eds.) *Beiträge zur Altertumskunde Kleinasiens: Festschrift für Kurt Bittel, Vol. 1*: 299-308. Mainz. Verlag Philipp von Zabern.

Kühne, H. 2000. Dur-katlimmu and the Middle-Assyrian Empire. In O. Rouault and M. Wäfler (eds.) *La Djéziré et l'Euphrate syriens de la protohistoire à la fin du II^e^ millénaire av. J.-C.* (Subartu 7): 271-279. Turnhout. Brepols.

Kühne, H. and G. Schneider. 1988. Neue Untersuchungen zur Metallischen Ware, *Damaszener Mitteilungen* 3: 83-139.

Kuzucuoğlu, C. 2007. Climatic and environmental trends during the third millennium B.C. in Upper Mesopotamia. In C. Kuzucuoğlu and C. Marro (eds.): *Sociétés humaines et changement climatique à la fin du troisième millénaire: une crise a-t-elle eu lieu en Haute Mésopotamie?* (Varia Anatolica XIX): 459-480. Istanbul. Institut Français d'Etudes Anatoliennes.

Laity, J. 2008. *Deserts and Desert Environments*. Chichester. Wiley-Blackwell.

Larsen, M. T. 1996. *The Conquest of Assyria. Excavations in an Antique Land*. London. Routledge.

Lawrence, D. 2012. *Early Urbanism in the Northern Fertile Crescent: A Comparison of Regional Settlement Trajectories and Millennial Landscape Change*, Ph.D. dissertation. Durham. Durham University, Department of Archaeology.

Lawrence, D. and T. J. Wilkinson. 2015. Hubs and upstarts: pathways to urbanism in the northern Fertile Crescent, *Antiquity* 89(344): 328-344.

Lawrence, D., J. Bradbury, and R. Dunford. 2012. Chronology, Uncertainty and GIS: A Methodology for Characterising and Understanding Landscapes of the Ancient Near East. In W. Bebermeier, R. Hebenstreit, E. Kaiser, and J. Krause (eds.) *Landscape Archaeology. Proceedings of the International Conference Held in Berlin, 6th-8th June 2012* (eTopoi special volume 3): 353-359. Berlin. Excellence Cluster Topoi.

Lebeau, M. 1990. Esquisse d'une histoire de la Haute Mésopotamie au début de l'Age du Bronze, *Zeitschrift für Assyriologie und vorderasiatische Archäologie* 80: 241-296.

Lebeau, M. 2000. *Stratified archaeological evidence and compared periodizations in the Syrian Jezirah during the third millennium B.C.* In C. Marro and H. Hauptmann (eds.): 167-191.

Lebeau, M. 2011a. Conclusion. In M. Lebeau (ed.): 343-380.

Lebeau, M. 2011b. Introduction. In M. Lebeau (ed.): 1-17.

Lebeau, M. (ed.) 2011. *Jezirah* (ARCANE vol. I). Turnhout. Brepols.

Lebeau, M. and F. Sakal. 2004-2014. *ARCANE Project (Associated Regional Chronologies for the Ancient Near East).* http://www.arcane.uni-tuebingen.de (Accessed 27/11/2014).

Liverani, M. 2014. *The Ancient Near East. History, society and economy*. Abingdon. Routledge.

Llobera, M. 2012. Life on a Pixel: Challenges in the Development of Digital Methods Within an "Interpretive" Landscape Archaeology Framework, *Journal of Archaeological Method and Theory* 19(4): 495-509.

Lloyd, S. 1938. Some Ancient Sites in the Sinjar District, *Iraq* 5: 123-142.

Lloyd, S. and F. Safar. 1945. Tell Hassuna: Excavations by the Iraq Government Directorate of Antiquities in 1943-1944, *Journal of Near Eastern Studies* 4(4): 255-330.

Lyonnet, B. 2001. L'occupation des marges arides de la Dézijé. Pastoralisme et nomadisme aux débuts du 3e et du 2e millénaire. In B. Geyer (ed.) *Conquête de la steppe et appropriation des terres sur les marges arides du Croissant fertile* (TMO 36): 15-26. Lyon. Maison de l'Orient et de la Méditerranée.

Lyonnet, B. 2009. Who Lived in the Third-Millennium "Round Cities" of Northern Syria? In J. Szuchman (ed.) *Nomads, Tribes, and the State in the Ancient Near East: Cross-Disciplinary Perspectives* (OIS 5): 179-200. Chicago, IL. University of Chicago Press.

Mallowan, M. E. L. 1936. The Excavations at Tall Chagar Bazar, and an Archaeological Survey of the Habur Region, 1934-5, *Iraq* 3(1): 1-85.

Mallowan, M. E. L. 1937. The Excavations at Tall Chagar Bazar, and an Archaeological Survey of the Habur Region. Second Campaign, 1936, *Iraq* 4(2): 91-177.

Mallowan, M. E. L. 1946. Excavations in the Balih Valley, 1938, *Iraq* 8: 111-159.

Mallowan, M. E. L. 1947. Excavations at Brak and Chagar Bazar, *Iraq* 9.

Margueron, J.-C. 2002-2003. Mari ou les débuts de la civilisation urbaine en Syrie, *AAAS* 45-46: 47-57.

Margueron, J.-C. 2004. *Mari. Métropole de l'Euphrate*. Paris. Editions A&J Picard.

Marro, C. and H. Hauptmann (eds.) 2000. *Chronologies des pays du Caucase et de l'Euphrate aux IV^{e}-III^{e} Millenaires* (Varia Anatolica XI). Istanbul. Institut Français d'Etudes Anatoliennes.

Mathys, T. 2001. *A GIS Comparative Analysis of Bronze Age Settlement Patterns and the Contemporary Physical Landscape in the Jazira Region of Syria*, M.A. dissertation. Athens, OH. Ohio University, Department of Geography.

Mazzoni, S. 2000. Syria and the Periodization of the Iron Age: A Cross-Cultural Perspective. In G. Bunnens (ed.) *Essays on Syria in the Iron Age*: 31-60. Leuven. Peeters Press.

McClellan, T. 1998. Tell Banat North: The White Monument. In M. Lebeau (ed.) *About Subartu: Studies Devoted to Upper Mesopotamia. Vol. I: Landscape, Archeology, Settlement* (Subartu 4, I): 243-269. Turnhout. Brepols.

McCorriston, J. 1997. The Fiber Revolution, *Current Anthropology* 38(4): 517-535.

Meijer, D. J. W. 2000. Ecology and Archaeology: Perceptions and Questions. In L. Milano, S. de Martino, F. M. Fales, and G. B. Lanfranchi (eds.) *Landscapes: Territories, Frontiers and Horizons in the Ancient Near East, Part II* (HANE/M-III/2): 203-212. Padova. Sargon srl.

Menze, B. H., J. A. Ur and A. G. Sherratt. 2005. Tell Spotting – Surveying Near Eastern Settlement Mounds from Space, *Proceedings of the CIPA 2005 XX International Symposium*: unpaginated CD-ROM.

Menze, B. H, J. A. Ur and A. G. Sherratt. 2006. Detection of Ancient Settlement Mounds: Archaeological Survey Based on the SRTM Terrain Model, *Photogrammetric Engineering and Remote Sensing* 72(3): 321-327.

Métral, F. 2000. Managing risk: sheep-rearing and agriculture in the Syrian steppe. In M. Mundy and B. Musallam (eds.) *The Transformation of Nomadic Society in the Arab East*: 123-144. Cambridge. Cambridge University Press.

Meyer, J.-W. 1996. Offene und geschlossene Siedlungen. Ein Beitrag zur Siedlungsgeschichte und historischen Topographie in Nordsyrien während des 3. und 2. Jts. v.Chr., *AoF* 23: 132-170.

Meyer, J.-W. 2000. Die zweite Grabungskampagne in Kharab Sayyar 1999, *MDOG* 132: 297-309.

Meyer, J.-W. 2007. Town Planning in 3rd Millennium Tell Chuera. In J. Bretschneider, J. Driessen, and K. van Lerberghe (eds.) *Power and Architecture*: 129-142. Leuven. Peeters Press.

Meyer, J.-W. 2009. Zur Entstehung urbaner Zentren in Nordostsyrien – Tell Chuera. Zusammenfassende Darstellung des historischen Hintergrunds zu den Forschungszielen des Rahmenthemas. In J.-W. Meyer (ed.) *Zwischen Euphrat und Rhein: Ergebnisse des Graduiertenkollegs "Archäologische Analytik"* (FArS 7): 55-59. Wiesbaden. Reichert Verlag.

Meyer, J.-W. 2010a. Versuch einer historischen Einordnung von Tell Chuera in die politisch-historische Entwicklung Nordostsyriens im 3. Jt. v.Chr. In J.-W. Meyer (ed.): 11-34.

Meyer, J.-W. 2010b. Überlegungen zur Siedlungsstruktur. Eine erste Analyse der geomagnetischen Prospektion. In J.-W. Meyer (ed.): 199-221.

Meyer, J.-W. 2010c. Erste Überlegungen zu den Befestigungsanlagen in Tell Chuera. In J.-W. Meyer (ed.): 173-186.

Meyer, J.-W. 2010d. Tribal community and State: The Change of Settlements and Settlement Patterns in Upper Mesopotamia During the 3rd Millennium B.C. – A Re-evaluation, *al-Rafidan Journal of Western Asiatic Studies* special issue "Formation of Tribal Communities": 203-211.

Meyer, J.-W. 2011. Town Planning. In Lebeau (ed.): 129-136.

Meyer, J.-W. (ed.) 2010. *Tell Chuera: Vorberichte zu den Grabungskampagnen 1998 bis 2005* (VFMOS 2, II). Wiesbaden. Harrassowitz Verlag.

Meyer, J.-W. and R. Hempelmann. 2006. Bemerkungen zu Mari aus der Sicht von Tell Chuera – Ein Beitrag zur Geschichte der ersten Hälfte des 3.Jts.v.Chr., *AoF* 33(1): 22-41.

Meyer, J.-W. and W. Orthmann. 2013. Die westliche Gazira in der Frühen Bronzezeit. In W. Orthmann, P. Matthiae, and M. al-Maqdissi (eds.) *Archéologie et Histoire de la Syrie, Vol. I*: 147-164. Wiesbaden. Harrassowitz Verlag.

Meyer, J.-W., I. Mussa, and M. Würz. 2007. Bericht über die 7. bis 9. Grabungskampagne 2005-2007 in Kharab Sayyar, *MDOG* 139: 43-69.

Meyer, J.-W., R. Hempelmann, I. Mussa, and M. Würz. 2005. Bericht über die 5. und 6. Grabungskampagne 2003-2004 in Kharab Sayyar, *MDOG* 137: 13-39.

Meyer, J.-W., M. al-Khalaf, I. Mussa, S. Doerner, R. Hempelmann, and M. Würz. 2003. Die 4. Grabungskampagne in Kharab Sayyar 2002, *MDOG* 135: 81-102.

Meyer, J.-W., M. al-Khalaf, C. Breitwieser, S. Doerner, R. Hempelmann, M. Würz, and A. Zysek. 2001. Die dritte Grabungskampagne in Kharab Sayyar 2000, *MDOG* 133: 199-223.

Migowski, C., M. Stein, S. Prasad, J. F. W. Negendank, and A. Agnon. 2006. Holocene Climate Variability and Cultural Evolution in the Near East from the Dead Sea Sedimentary Record, *Quaternary Research* 66(3): 421-431.

Milano, L. 1995. Ebla: a third millennium city-state in ancient Syria. In J. Sasson (ed.) *Civilizations of the Ancient Near East, Vol. 2*: 1219-1230. New York, NY. Charles Scribner's Sons.

Milano, L. 2012. Reflections about City Administration, Record-keeping and the Management of Primary Resources at Tell Beydar / Nabada. In G. B. Lanfranchi, D. Morandi Bonacossi, C. Pappi, and S. Ponchia (eds.) *Leggo! Studies Presented to Frederick Mario Fales on the Occasion of His 65th Birthday*: 507-525. Wiesbaden. Harrassowitz Verlag.

Millard, A. R. 1988. The Bevelled-Rim Bowls: Their Purpose and Significance, *Iraq* 50: 49-57.

Moortgat, A. 1959. *Archäologische Forschungen der Max Freiherr von Oppenheim-Stiftung im nördlichen Mesopotamien 1956*. Köln. Westdeutscher Verlag.

Moortgat, A. 1965. *Tell Chuera in Nordost-Syrien. Vorläufiger Bericht über die vierte Grabungskampagne 1963*. Köln. Westdeutscher Verlag.

Moortgat-Correns, U. 1972. *Die Bildwerke vom Djebelet el Beda in ihrer räumlichen und zeitlichen Umwelt*. Berlin. de Gruyter.

Moortgat-Correns, U. 1988. *Tell Chuera in Nordost-Syrien. Vorläufige Berichte über die neunte und zehnte Grabungskampagne 1982 und 1983*. Berlin. Gebrüder Mann Verlag.

Moortgat-Correns, U. 1992. *Charab Sejar: Eine fruhabbasidische Ruinenstatte in Nordmesopotamien*. Berlin. Gebrüder Mann Verlag.

Müller-Neuhof, B. 2014a. A ‘marginal’ region with many options: the diversity of Chalcolithic/Early Bronze Age socio-economic activities in the hinterland of Jawa, *Levant* 46(2): 230-248.

Müller-Neuhof, B. 2014b. Desert Irrigation Agriculture: Evidences for Early Bronze Age Rainwater-Harvesting Irrigation Agriculture at Jawa (NE-Jordan). In D. Morandi Bonacossi (ed.) *Settlement Dynamics and Human-Landscape Interaction in the Dry Steppes of Syria* (Studia Chaburensia 4): 187-197. Wiesbaden. Harrassowitz Verlag.

Musil, A. 1927. *The Middle Euphrates. A Topographical Itinerary*. New York, NY. American Geographical Society.

Nieuwenhuyse, O. 2000. Halaf Settlement in the Khabur Headwaters. In B. Lyonnet (ed.) *Prospection archéologique Haut-Khabur occidental (Syrie du N. E.), Vol. I* (BAH 155): 151-260. Beirut. Institut français d'archéologie du Proche-Orient.

Nishiaki, Y. 2010. Archaeological Evidence of the Early Bronze Age Communities in the Middle Euphrates Steppe, North Syria, *al-Rafidan Journal of Western Asiatic Studies* special issue “Formation of Tribal Communities”: 37-48.

Nishimura, Y. 2014. North Mesopotamian Urban Neighborhoods at Titriş Höyük in the Third Millennium BC. In A. T. Creekmore and K. D. Fisher (eds.) *Making Ancient Cities: Space and Place in Early Urban Societies*: 74-110. Cambridge. Cambridge University Press.

Oates, J. 1960. Ur and Eridu, the Prehistory, *Iraq* 22: 32-50.

Oates, J. 1982. Some Late Early Dynastic III Pottery from Tell Brak, *Iraq* 44(2): 205-219.

Oppenheim, A. L. 1964. *Ancient Mesopotamia. Portrait of a Dead Civilization*. Chicago, IL. University of Chicago Press.

Oram, P. A. and C. de Haan. 1995. *Technologies for Rainfed Agriculture in Mediterranean Climates* (World Bank Technical Paper 300). Washington, D.C. The World Bank.

Orthmann, W. 1995. Einleitung. In W. Orthmann (ed.): 11-15.

Orthmann, W. 2002. *Die aramäisch-assyrische Stadt Guzana: Ein Rückblick auf die Ausgrabungen Max von Oppenheims in Tell Halaf.* Saarbrücken. Saarbrücker Druckerei und Velag.

Orthmann, W. (ed.) 1995. *Ausgrabungen in Tell Chuera in Nordost-Syrien: Vorbericht über die Grabungskampagnen 1986 bis 1992*. Saarbrücken. Saarbrücker Druckerei und Verlag.

Palmisano, A. 2015. *Spatial Approaches to the Political and Commercial Landscape of the Old Assyrian Colony Period*, Ph.D. dissertation. London. University College London, Institute of Archaeology.

Parrot, A. 1940. Les fouilles de Mari sixième campagne (automne 1938), *Syria* 21(1): 1-28.

Pfälzner, P. 1993. Die Späte Bronzezeit: Tall Umm ‘Aqrebe. In R. Bernbeck (ed.) *Steppe als Kulturlandschaft* (Berliner Beiträge zum Vordern Orient: Ausgrabungen 1): 70-96. Berlin. Dietrich Reimer Verlag.

Pfälzner, P. 1997. Wandel und Kontinuität im Urbanisierungsprozeß des 3. Jahrtausends v.Chr. in Nordmesopotamien. In G. Wilhelm (ed.) *Die orientalische Stadt: Kontinuität, Wandel, Bruch*: 239-265. Saarbrücken. Saarbrücker Druckerei und Verlag.

Pfälzner, P. 1998. Eine Modifikation der Periodisierung Nordmesopotamiens im 3. Jtsd. v. Chr., *MDOG* 130: 69-71.

Pfälzner, P. 2001. *Haus und Haushalt: Wohnformen des dritten Jahrtausends vor Christus in Nordmesopotamien*. Mainz. Verlag Philipp von Zabern.

Philip, G. and J. Bradbury. 2010. Pre-Classical Activity in the Basalt Landscape of the Homs Region, Syria: Implications for the Development of ‘Sub-Optimal’ Zones in the Levant During the Chalcolithic-Early Bronze Age, *Levant* 42(2) : 136–169.

Philip, G., D. Donoghue, A. Beck, and N. Galiatsatos. 2002. CORONA satellite photography: an archaeological application from the Middle East, *Antiquity* 76 (291): 109-118.

Plog, S. and J. L. Hantman. 1990. Chronology Construction and the Study of Prehistoric Cultural Change, *Journal of Field Archaeology* 17(4): 439-456.

Poidebard, A. 1928. Mission archéologique en Haute Djezireh (automne 1927), *Syria* 9: 216-223.

Poidebard, A. 1934. *La trace de Rome dans le désert de Syrie*. Paris. Geuthner.

Porter, A. 2002. The dynamics of death: Ancestors, pastoralism and the origins of a third millennium city in Syria, *BASOR* 325: 1-36.

Porter, A. 2004. The Urban Nomad: Countering the old Clichés. In C. Nicolle (ed.) *Nomades et sédentaires dans le Proche-Orient ancient* (Amurru 3): 69-74. Paris. Editions Recherche sur les Civilisations.

Porter, A. 2012. *Mobile Pastoralism and the Formation of Near Eastern Civilizations. Weaving Together Society*. Cambridge. Cambridge University Press.

Postgate, J. N. 1994. How many Sumerians per hectare? Probing the anatomy of an early city, *Cambridge Archaeological Journal* 4(1): 47-65.

Prag, K. 2009. The Late Third Millennium in the Levant: A Reappraisal of the North-South Divide. In P. J. Parr (ed.) *The Levant in Transition* (PEF Annual IX): 80-89. Leeds. Maney.

Preuss, G. 1989. *Die Metallische Ware: Versuch einer Einordnung*, M.A. dissertation. Tübingen. Eberhard-Karls-Universität, Altorientalisches Seminar.

Pruß, A. 2000. The Metallic Ware of Upper Mesopotamia: Definition, Chronology and Distribution. In C. Marro and H. Hauptmann (eds.): 193-203.

Pruß, A. 2001. Die Graue Gazira-Ware. In J.-W. Meyer, M. Novák, and A. Pruß (eds.) *Beiträge zur Vorderasiatischen Archäologie, Winfried Orthmann gewidmet*: 412-429. Frankfurt. Johann Wolfgang Goethe-Universität, Archäologisches Institut.

Pruß, A. 2005. Wadi Hamar-Survey: Zur Besiedlungsentwicklung der Region um Tell Chuera, *Alter Orient Aktuell* 6: 12-14.

Pruß, A. 2013a. A Synopsis of the Euro-Syrian Excavations at Tell Beydar. In D. Bonatz and L. Martin (eds.) *100 Jahre archäologische Feldforschungen in Nordost-Syrien – eine Bilanz*: 133-148. Wiesbaden. Harrassowitz Verlag.

Pruß, A. 2013b. The last centuries of the 3rd millennium in the Syrian Gezira. In W. Orthmann, P. Matthiae, and M. al-Maqdissi (eds.) *Archéologie et Histoire de la Syrie, Vol. I*: 137-145. Wiesbaden. Harrassowitz Verlag.

Pruß, A. and W. Sallaberger. 2003-2004. Tierhaltung in Nabada / Tell Beydar und die Bilderwelt der Terrakotten als Spiegel vonWirtschaft und Umwelt, *AfO* 50: 293-307.

Quenet, P. 2011. Stratigraphy. In M. Lebeau (ed.): 19-47.

Quenet, P. and M.-L. Chambrade. 2013. Nouveaux kites en Jezireh syrienne. In M. al-Maqdissi, D. Parayre, M. Griesheimer, and É. Ishaq (eds.) *Un cœur syrien. Mélanges dédiés à la mémoire d'Antoine Souleiman* (Studia Orontica 11): 61-76. Damascus. Direction Générale des Antiquités et des Musées de Syrie.

Quenet, P. and A. Sultan. 2014. New Research in the Area of Malhat ed-Deru, Northeast Syria (Autumn 2010). In P. Bieliński, M. Gawlikowski, R. Koliński, D. Ławecka, A. Sołtysiak, and Z. Wygnańska (eds.) *Proceedings of the 8th International Congress on the Archaeology of the Ancient Near East, Vol. 2*: 117-131. Wiesbaden. Harrassowitz Verlag.

Quenet, P., C. Castel, and J.-W. Meyer (eds.) in press. *Origins, Structure, Development and Sociology of Circular Cities of Early Bronze Age Syria* (Subartu T.B.A.). Turnhout. Brepols.

Rayne, L. 2014. *Water and Territorial Empires*, Ph.D. dissertation. Durham. Durham University, Departments of Archaeology and Geography.

Redman, C. L. 1982. Archaeological Survey and the Study of Mesopotamian Urban Systems, *Journal of Field Archaeology* 9(3): 375-382.

Renfrew, C. 1986. Introduction: peer polity interaction and socio-political change. In C. Renfrew and J. F. Cherry (eds.) *Peer Polity Interaction and Socio-Political Change*: 1-18. Cambridge. Cambridge University Press.

Rey, S. 2012. *Poliorcétique au Proche-Orient à l'âge du bronze: fortifications urbaines, procédés de siège et systèmes défensifs* (RAH 197). Beirut. Institut français du Proche-Orient.

Rey, S. 2013. Éléments de classification des villes fortifiées du Proche-Orient à l'âge du Bronze, *Cahier des Thèmes transversaux ArScAn* 11, Thème 8: 231-251.

Riehl, S. 2008. Climate and agriculture in the ancient Near East: a synthesis of the archaeobotanical and stable carbon isotope evidence, *Vegetation History and Archaeobotany* 17(1 supplement): 43-51.

Riehl, S. 2009. Archaeobotanical evidence for the interrelationship of agricultural decision-making and climate change in the ancient Near East, *Quaternary International* 197(1-2): 93-114.

Riehl, S., R. Bryson, and K. Pustovoytov. 2008. Changing growing conditions for crops during the Near Eastern Bronze Age (3000-1200 BC): the stable carbon isotope evidence, *Journal of Archaeological Science* 35(4): 1011-1022.

Riehl, S., K. Pustovoytov, A. Dornauer, and W. Sallaberger. 2012. Mid-To-Late Holocene Agricultural System Transformations in the Northern Fertile Crescent: A Review of the Archaeobotanical, Geoarchaeological, and Philological Evidence. In L. Giosan, D. Q. Fuller, K. Nicoll, R. K. Flad, and P. D. Clift (eds.) *Climates, Landscapes, and Civilizations* (Geophysical Monograph Series 198): 115-136. Washington, D.C. American Geophysical Union.

Ristvet, L. 2015. *Ritual, Performance, and Politics in the Ancient Near East*. Cambridge. Cambridge University Press.

Roberts, N. 2014. *The Holocene. An Environmental History*. 3rd edition. Chichester. Wiley-Blackwell.

Röllig, W. and H. Kühne. 1977-1978. The Lower Habur: A Preliminary Report on a Survey Conducted by the Tübinger Atlas des Vorderen Orients in 1975, *AAAS* 27/28: 115-140.

Röllig, W. and H. Kühne. 1983. The Lower Habur: Second Preliminary Report on a Survey in 1977, *AAAS* 33(2): 187-199.

Rosen, S. A. 1992. Nomads in Archaeology: A Response to Finkelstein and Perevolotsky, *BASOR* 287: 75-85.

Rothman, M. S. 2001. The Local and the Regional: An Introduction. In M. S. Rothman (ed.): 3-26.

Rothman, M. S. 2002. Tepe Gawra: Chronology and Socio-economic Change in the Foothills of Northern Iraq in the Era of State Formation. In J. N. Postgate (ed.) *Artefacts of Complexity: Tracking the Uruk in the Near East* (Iraq Archaeological Reports 5): 49-77. Warminster. British School of Archaeology in Iraq.

Rothman, M. S. (ed.) 2001. *Uruk Mesopotamia and Its Neighbours*. Santa Fe. School of American Research Press.

Rova, E. 2011. Ceramic. In M. Lebeau (ed.): 49-127.

Sallaberger, W. and A. Pruß. 2015. Home and Work in Early Bronze Age Mesopotamia: "Ration Lists" and "Private Houses" at Tell Beydar/Nabada. In P. Steinkeller and M. Hudson (eds.) *Labor in the Ancient World* (ISCANEE 5): 69-136. Dresden. ISLET.

Sallaberger, W. and J. A. Ur. 2004. Tell Beydar/Nabada in its Regional Setting. In L. Milano, W. Sallaberger, P. Talon, and K. van Lerberghe (eds.) *Third Millennium Cuneiform Texts from Tell Beydar (Seasons 1996-2002)* (Subartu 12): 51-71. Turnhout. Brepols.

Salzman, P. C. 2002. Pastoral Nomads: Some General Observations Based on Research in Iran, *Journal of Anthropological Research* 58(2): 245-264.

Sanlaville, P. 2000. Environment and development. In M. Mundy and B. Musallam (eds.) *The Transformation of Nomadic Society in the Arab East*: 6-16. Cambridge. Cambridge University Press.

Schneider, G. and M. Daszkiewicz. 2001. Stone Ware and Ninevite 5: Notes on Composition and Technology of Pottery from Tell Brak. In D. Oates, J. Oates, and H. McDonald (eds.) *Excavations at Tell Brak. Vol. 2: Nagar in the third millennium BC*: 194-216. Cambridge. McDonald Institute for Archaeological Research.

Schneider, U., A. Becker, A. Meyer-Christoffer, M. Ziese, and B. Rudolf. 2011. *Global Precipitation Analysis Products of the GPCC*. [ebook] Darmstadt. Global Precipitation Climatology Centre, Deutscher Wetterdienst. http://www.dwd.de/bvbw/generator/DWDWWW/Content/Oeffentlichkeit/KU/KU4/KU42/en/Reports__Publications/GPCC__intro__products__2011,templateId=raw,property=publicationFile.pdf/GPCC_intro_products_2011.pdf (Accessed 10/04/2015).

Schoop, U-D. 2014. Weaving Society in Late Chalcolithic Anatolia: Textile Production and Social Strategies in the 4th Millennium BC. In B. Horejs and M. Mehofer (eds.) *Western Anatolia before Troy. Proto-Urbanisation in the 4th Millennium BC?* (OREA 1): 421-446. Wien. Austrian Academy of Sciences.

Schwartz, G. 2001. Syria and the Uruk Expansion. In M. S. Rothman (ed.): 233-264.

Sherratt, A. G. 2004. Spotting Tells from Space, *Antiquity* 78(301). http://antiquity.ac.uk/projgall/sherratt/index.html (Accessed 4/02/2014).

Smith, C. A. 1990. Types of City-Size Distributions: A Comparative Analysis. In A. van der Woude, A. Hayami, and J. de Vries (eds.) *Urbanization in History: A Process of Dynamic Interactions*: 20-42. Oxford. Clarendon Press.

Smith, J. H. 1904. Appendix: John Hugh Smith's Diary of a Journey from Aleppo to Urfa by Way of Deir Zor and the Khabur. In M. Sykes. *Dar ul-Islam: A Record of a Journey through Ten of the Asiatic Provinces of Turkey*: 269-290. London. Bickers & Son.

Smith, S. L. 2008. *Continuity in the Khabur: Investigating the Importance of Landscape as a Component of Archaeological Study by Examining Tell Sites in North-Eastern Syria*, M.A. dissertation. Durham. Durham University, Department of Archaeology.

Smith, S. L. 2014a. The Economy of Landscape. Agro-pastoralism in Uncertain Margins. In F. Buccellati, T. Helms, and A. Tamm (eds.) *House and Household Economies in 3rd Millennium B.C.E. Syro-Mesopotamia* (BAR International Series 2682): 103-113. Oxford. Archaeopress.

Smith, S. L. 2014b. Exploitation with Adaptation: The Effect of the Semi-Arid Steppe Landscape of Northern Syria on "Kranzhügel" Settlements. Paper presented at the 3rd International Landscape Archaeology Conference, Rome, 17-20 September.

Smith, S. L. and T. J. Wilkinson. in press. The Circular Cities of Northern Syria in their Environmental Context. In P. Quenet, C. Castel, and J.-W. Meyer (eds.)

Smith, S. L., T. J. Wilkinson, and D. Lawrence. 2014. Agro-pastoral Landscapes in the Zone of Uncertainty. In D. Morandi Bonacossi (ed.) *Settlement Dynamics and Human-Landscape Interaction in the Dry Steppes of Syria* (Studia Chaburensia 4): 151-172. Wiesbaden. Harrassowitz Verlag.

Stein, G. J. 2004. Structural Parameters and Sociocultural Factors in the Economic Organization of North Mesopotamian Urbanism in the Third Millennium B.C. In G. M. Feinman and L. M. Nicholas (eds.) *Archaeological Perspectives on Political Economies*: 61-78. Salt Lake City, UT. University of Utah Press.

Stein, G. J. 2012. The Development of Indigenous Social Complexity in Late Chalcolithic Upper Mesopotamia in the 5th-4th Millennia BC – An Initial Assessment, *Origini* 34: 125-151.

Stewart, B. A., O. R. Jones, and P. W. Unger. 1993. Moisture Management in Semiarid Temperate Regions. In J. P. Srivastava and H. Alderman (eds.) *Agriculture and Environmental Challenges: Proceedings of the Thirteenth Agricultural Sector Symposium*: 67-80. Washington, D.C. The World Bank.

Tamm, A. 2010. Aspekte der Wasserversorgung nordsyrischer Siedlungen im 3. Jahrtausend v. Chr.: Brunnen und Zisternen. In J. Becker, R. Hempelmann, and E. Rehm (eds.) *Kulturlandschaft Syrien. Zentrum und Peripherie. Festschrift für Jan-Waalke Meyer* (AOAT 371): 579-588. Münster. Ugarit-Verlag.

Tamm, A. 2014. Domestic architecture in the southeastern lower town of Tell Chuera. In F. Buccellati, T. Helms, and A. Tamm (eds.) *House and Household Economies in 3rd Millennium B.C.E. Syro-Mesopotamia* (BAR International Series 2682): 115-123. Oxford. Archaeopress.

Thureau-Dangin, F. 1931. *Arslan-Tash* (Bibliothèque archéologique et historique 16). Paris. Geuthner.

Treacher, T. T. 2000. Linkages between livestock and agricultural systems in Syria. In M. Mundy and B. Musallam (eds.) *The Transformation of Nomadic Society in the Arab East*: 187-196. Cambridge. Cambridge University Press.

Ur, J. A. 2003. CORONA Satellite Photography and Ancient Road Networks: A Northern Mesopotamian Case Study, *Antiquity* 77(295): 102-115.

Ur, J. A. 2004. *Urbanism and Society in the Third Millennium Upper Khabur Basin*, Ph.D. dissertation. Chicago, IL. University of Chicago, Department of Near Eastern Languages and Civilizations.

Ur, J. A. 2010a. *Urbanism and Cultural Landscapes in Northeastern Syria. The Tell Hamoukar Survey, 1999-2001* (OIP 137). Chicago, IL. University of Chicago Press.

Ur, J. A. 2010b. Cycles of Civilization in Northern Mesopotamia, 4400-2000 BC, *Journal of Archaeological Research* 18: 387-431.

Ur, J. A., L. de Jong, J. Giraud, J. F. Osborne, and J. MacGinnis. 2013. Ancient cities and landscapes in the Kurdistan region of Iraq: The Erbil Plain Archaeological Survey 2012 season, *Iraq* 75: 89-118.

van Liere, W. J. 1963. Capitals and Citadels of Bronze-Iron Age Syria in their Relationship to Land and Water, *AAAS* 13: 108-122.

van Liere, W. J. and J. Lauffray. 1955. Nouvelle prospection archéologique dans la Haute Jezireh Syrienne, *AAAS* 5: 129-148.

Vértesalji, P. P. 1982. Mesopotamien zu Beginn der Städtebildung. *Tübinger Atlas des vorderen Orients*, Blatt B I 17, 1:2,000,000. Wiesbaden. Dr. Ludwig Reichert Verlag.

Vila, E. 1995. Analyse de la faune des secteurs nord et sud du Steinbau 1. In Winfried Orthmann (ed.): 267-279.

Vila, E. 2010. Etude de la faune mammalienne de Tell Chuera, secteurs H et K (2000-2007) et de Kharab Sayyar, secteur A (Bronze ancien, Syrie). In J.-W. Meyer (ed.): 223-291.

Vinogradov, N. B. and A. V. Epimakhov. 2000. From a Settled Way of Life to Nomadism. Variants in Models of Transition. In J. Davis-Kimball, E. M. Murphy, L. Koryakova, and L. T. Yablonksy (eds.) *Kurgans, Ritual Sites, and Settlements: Eurasian Bronze and Iron Age* (BAR International Series 890): 240-246. Oxford. Archaeopress.

Vita-Finzi, C. and E. S. Higgs. 1970. Prehistoric Economy in the Mount Carmel Area of Palestine. Site Catchment Analysis, *Proceedings of the Prehistoric Society* 36: 1-37.

von Oppenheim, M. 1900. *Vom Mittelmeer zum Persischen Golf: durch den Hauran, die syrische Wüste und Mesopotamien, Band II*. Berlin. Dietrich Reimer Verlag.

von Oppenheim, M. 1901. Bericht über eine im Jahr 1899 aüsgeführte Forschungsreise in der Asiatischen Türkei, *Zeitschrift der Gesellschaft für Erdkunde zu Berlin* 36: 69-99.

von Oppenheim, M. 1908. Der Tell Halaf und die verschleierte Göttin, *Der Alte Orient* 10(1).

von Oppenheim, M. 1911. Die zweite Forschungsreise von Dr. Max Frhrn v. Oppenheim in der Asiatischen Türkei, *Petermanns Mitteilungen* 52(2): 81.

von Oppenheim, M. 1933. *Tell Halaf: a new culture in oldest Mesopotamia*. London. G. P. Putnam's Sons.

von Oppenheim, M. 1943. Meine Forschungsreisen in Obermesopotamien, *Nachrichten aus dem Reichsvermessungsdienst* Sonderheft 21/22.

Wachholtz, R. 1996. *Socio-Economics of Bedouin Farming Systems in Dry Areas of Northern Syria* (Farming Systems and Resource Economics in the Tropics 24). Kiel. Wissenschaftsverlag VAUK.

Weicken, H.-M. and A. Wener. 1995. Untersuchungen zur holozänen Relief- und Bodenentwicklung im Umkreis des Tell Chuera. In Winfried Orthmann (ed.): 281-324.

Weiss, H. 2000. Beyond the Younger Dryas. Collapse as Adaptation to Abrupt Climate Change in Ancient West Asia and the Eastern Mediterranean. In G. Bawden and R. M. Reycraft (eds.) *Environmental Disaster and the Archaeology of Human Response* (Maxwell Museum of Anthropology Anthropological Papers 7): 75-98. Albuquerque, NM. Maxwell Museum of Anthropology.

Weiss, H. 2003. Ninevite 5 Periods and Processes. In E. Rova and H. Weiss (eds.) *The Origins of North Mesopotamian Civilization: Ninevite 5 Chronology, Economy, Society* (Subartu 9): 593-624. Turnhout. Brepols.

Wick, L., G. Lemcke, and M. Sturm. 2003. Evidence of Lateglacial and Holocene climatic change and human impact in eastern Anatolia: high-resolution pollen, charcoal, isotopic and geochemical records from the laminated sediments of Lake Van, Turkey, *The Holocene* 13(5): 665-675.

Wilkinson, T. J. 1993. Linear hollows in the Jazira, Upper Mesopotamia, *Antiquity* 67(256): 548-562.

Wilkinson, T. J. 1994. The Structure and Dynamics of Dry-Farming States in Upper Mesopotamia, *Current Anthropology* 35(5): 483-520.

Wilkinson, T. J. 1997. Environmental Fluctuations, Agricultural Production and Collapse: A View from Bronze Age Upper Mesopotamia. In H. N. Dalfes, G. Kukla, and H. Weiss (eds.) *Third Millennium BC Climate Change and Old World Collapse* (NATO ASI Series I, 49): 67-106. Berlin. Springer Verlag.

Wilkinson, T. J. 2000a. Regional Approaches to Mesopotamian Archaeology: The Contribution of Archaeological Surveys, *Journal of Archaeological Research* 8(3): 219-267.

Wilkinson, T. J. 2000b. Settlement and Land Use in the Zone of Uncertainty in Upper Mesopotamia. In R. Jas (ed.) *Rainfall and Agriculture in Northern Mesopotamia* (MOS Studies 3): 3-35. Leiden. Nederlands Instituut voor het Nabije Oosten.

Wilkinson, T. J. 2004. *On the Margin of the Euphrates: Settlement and land use at Tell es-Sweyhat and in the Upper Lake Assad Area, Syria* (OIP 124). Chicago, IL. Oriental Institute Publications.

Wilkinson, T. J. and C. Hritz. 2013. Physical Geography, Environmental Change and the Role of Water. In T. J. Wilkinson, McG. Gibson, and M. Widell (eds.) *Models of Mesopotamian Landscapes* (BAR International Series 2552): 9-33. Oxford. Archaeopress.

Wilkinson, T. J. and D. J. Tucker. 1995. *Settlement development in the North Jazira, Iraq: a study of the archaeological landscape* (IAR 3). Warminster. Aris & Phillips.

Wilkinson, T. J., J. A. Ur, and J. Casana. 2004. From Nucleation to Dispersal: Trends in Settlement Pattern in the Northern Fertile Crescent. In S. E. Alcock and J. F. Cherry (eds.) *Side-by-Side Survey: Comparative Regional Studies in the Mediterranean World*: 189-205. Oxford. Oxbow Books.

Wilkinson, T. J., J. Christiansen, M. Altaweel, and M. Widell. 2013. Output from the Agent-Based Modeling Program. In T. J. Wilkinson, McG. Gibson, and M. Widell (eds.) *Models of Mesopotamian Landscapes* (BAR International Series 2552): 177-203. Oxford. Archaeopress.

Wilkinson, T. J., C. French, J. A. Ur, and M. Semple. 2010. The Geoarchaeology of Route Systems in Northern Syria, *Geoarchaeology* 25(6): 745-771.

Wilkinson, T. J., N. Galiatsatos, D. Lawrence, A. Ricci, R. Dunford, and G. Philip. 2012. Late Chalcolithic and Early Bronze Age Landscapes of Settlement and Mobility in the Middle Euphrates: A Reassessment, *Levant* 44(2): 139-185.

Wilkinson, T. J., G. Philip, J. Bradbury, R. Dunford, D. Donoghue, N. Galiatsatos, D. Lawrence, A. Ricci, and S. L. Smith. 2014. Contextualizing Early Urbanization: Settlement Cores, Early States and Agropastoral Strategies in the Fertile Crescent During the Fourth and Third Millennia BC, *Journal of World Prehistory* 27(1): 43-109.

Wirth, E. 1971. *Syrien. Eine geographische Landeskunde* (Wissenschaftliche Länderkunden 4/5). Darmstadt. Wissenschaftliche Buchgesellschaft.

Wolfart, R. 1967. *Geologie von Syrien und dem Libanon* (Beiträge zur regionalen Geologie der Erde 6). Berlin. Gebrüder Borntraeger.

Wossink, A. 2009. *Challenging Climate Change. Competition and cooperation among pastoralists and agriculturalists in northern Mesopotamia (c. 3000-1600 BC)*. Leiden. Sidestone Press.

Wright, H. T. and G. A. Johnson. 1975. Population, Exchange, and Early State Formation in Southwestern Iran, *American Anthropologist* 77(2): 267-289.

Ziegler, N., and H. Reculeau. 2014. The Sutean Nomads in the Mari Period. In D. Morandi Bonacossi (ed.) *Settlement Dynamics and Human-Landscape Interaction in the Dry Steppes of Syria* (Studia Chaburensia 4): 209-226. Wiesbaden. Harrassowitz Verlag.

Zobler, K. A. 2014. Syrian Archaeological Heritage Management: “Dead Cities” and Living Communities. In C. Smith (ed.) *Encyclopedia of Global Archaeology*: 7194-7199. New York, NY. Springer.